Amplify Desmos Math FLORIDA

ACC 7

Assessment and Lesson Resources

Inside you'll find:

- Unit and Lesson Assessments
- Answer keys
- Activity sheets and Cards

Amplify Desmos Math FLORIDA

Accelerated 7

Assessment and Lesson Resources

About Amplify

Amplify is dedicated to collaborating with educators to create learning experiences that are rigorous and riveting for all students. Amplify creates K–12 core and supplemental curriculum, assessment, and intervention programs for today's students.

A pioneer in K–12 education since 2000, Amplify is leading the way in next-generation curriculum and assessment. All of our programs provide teachers with powerful tools that help them understand and respond to the needs of every student.

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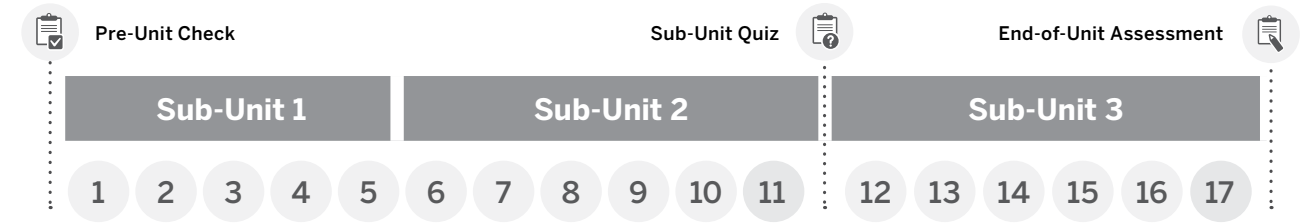
Assessment Overview

Throughout the lessons, units, and course, you'll find summative and formative assessments that provide insights into students' conceptual understanding, procedural fluency, and application, as described in the grade-level standards.

Course

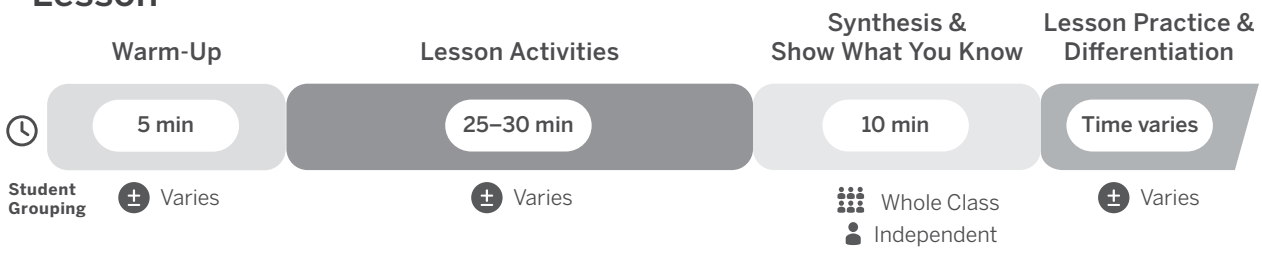
UNIT 1	UNIT 2	UNIT 3	UNIT 4	UNIT 5	UNIT 6	UNIT 7	UNIT 8	UNIT 9	UNIT 10	UNIT 11
13 days	20 days	14 days	12 days	18 days	11 days	12 days	16 days	21 days	19 days	7 days

Unit



Note: The number of sub-units, quizzes, and lessons within each unit varies. This depiction shows the general structure of a unit. See the course Table of Contents in the Teacher Edition for more details.

Lesson



Assessment Philosophy

- There are a variety of informal and formal assessment opportunities throughout a unit and course.
- Problems on assessments vary in form and depth of knowledge.
- Some problems mirror lesson problems, while others ask students to apply their knowledge to new situations.
- Students are often asked to explain their thinking or decide and defend an opinion.
- When possible, problems are designed so they can be approached from multiple angles and using different strategies.

End-of-Lesson Assessment

Every lesson ends with an opportunity to check in, as well as ideas about next steps based on students' level of understanding.

Show What You Know

Each lesson has a daily formative assessment focused on key concepts in the lesson.

- Show What You Know moments are designed to minimize the time they take to complete while maximizing the insight they give teachers, so that teachers can better attend to student needs in the following class.

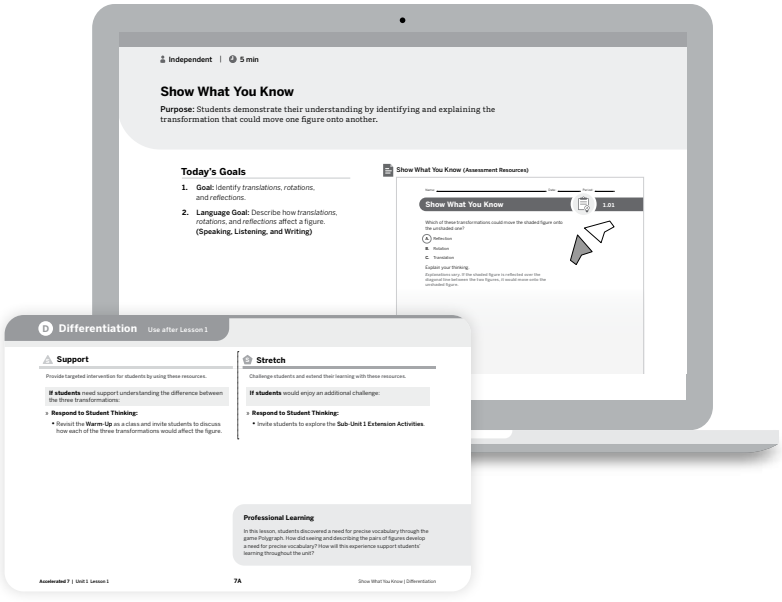
Differentiation Beyond the Lesson

Every Show What You Know is accompanied by options for differentiation beyond the lesson that are based on students' work.

The differentiation table offers suggestions to **support**, **strengthen**, and **stretch** student learning. It's available in the Teacher Edition and on the digital lesson page.

These suggestions can include:

- Mini-Lessons
- Previous Lessons
- Specific Teacher Moves
- Lesson Practice
- DOK 3 Lesson Practice problems
- Extensions



Unit-Level Assessments

Embedded unit assessments offer key insights into students' understanding of the grade-level standards in the unit.

Types of Assessment

Each unit includes an optional Pre-Unit Check, one or more Sub-Unit Quizzes, and an End-of-Unit Assessment.

Pre-Unit Check

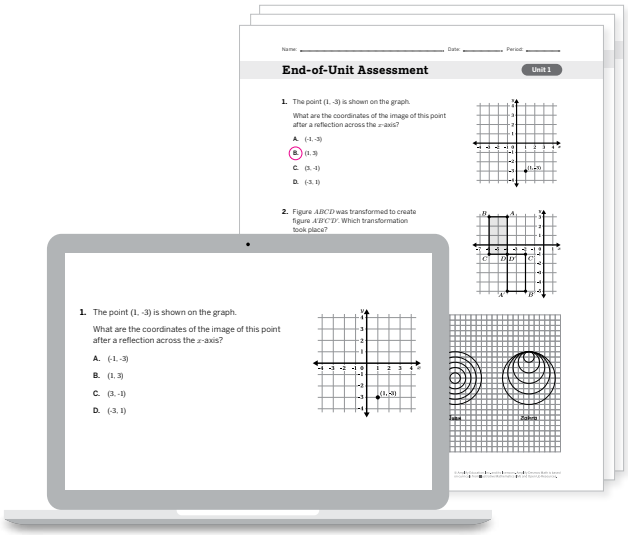
Each unit begins with an optional check of students' understanding of the foundational concepts and skills that will support them in the upcoming unit. It can be assigned in its entirety before the unit or spread throughout the unit.

Sub-Unit Quizzes

Each unit contains one or more sub-unit quizzes designed to assess students' understanding of the content up to that point in the unit.

End-of-Unit Assessment

Each unit ends with an assessment of students' understanding of the content in that unit. There are two forms of each End-of-Unit Assessment: Form A and Form B.



All assessments are available digitally, in the Assessment and Lesson Resources book, as downloadable PDFs.

Assess and Respond Guides

Each assessment is accompanied by an Assess and Respond Guide in the Teacher Edition.

Item Analysis

Look up the standard, depth of knowledge (DOK), and concept associated with each problem.

Item Analysis, Forms A and B

Problem(s)	Concept or skill	Addressed in	DOK	FL B.E.S.T. Math Benchmarks
1	Reflecting a single point on a coordinate plane	Lesson 3	1	MA.8.GR.2.3
2	Identifying which rigid transformation took place given a preimage and image of a rectangle on a coordinate plane	Lesson 4	1	MA.8.GR.2.3
3	Using properties of congruent figures	Lesson 5	2	MA.8.GR.2.1
4	Using rigid transformation to show congruence	Lesson 7	2	MA.8.GR.2.3
5	Explaining whether two figures are congruent on a coordinate plane	Lesson 7	2	MA.8.GR.2.3
6a	Using angle relationships to solve for unknown angle measures	Lesson 9	2	MA.8.GR.1.4
6b	Critiquing the reasoning of another who inaccurately wrote an equation relating angle measures.	Lesson 9	3	MA.8.GR.1.4
7a	Recognizing congruent sides given a diagram of transformed triangles	Lesson 6	2	MA.8.GR.2.1
7b	Recognizing congruent triangles given a diagram of transformed triangles	Lesson 7	1	MA.8.GR.2.1
7c	Determining angle measurements using angle relationships in triangles	Lesson 8	2	MA.8.GR.1.5

D Differentiation

Respond to student thinking through resources and teacher moves that **support**, **strengthen**, and **stretch** learning.

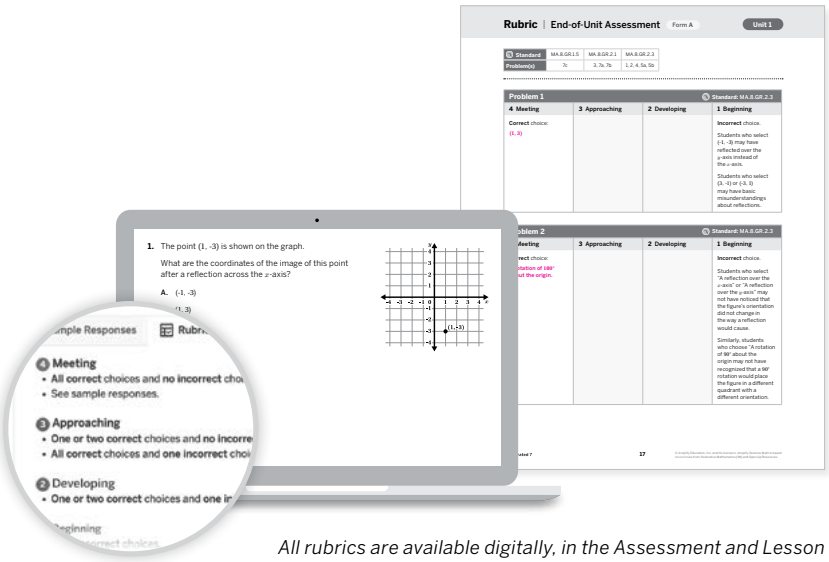
Assessment Rubrics and Grading

Amplify Desmos Math Florida comes with tools that support you in giving students standards-based feedback in a variety of ways.

Assessment Rubrics

In-depth rubrics help teachers anticipate and respond to students' learning needs.

- Every Sub-Unit Quiz and End-of-Unit Assessment includes an accompanying rubric.
- The purpose of the rubric is to support teachers in recognizing what students might understand, especially when their answers do not match the correct responses.
- Rubrics are aligned to the 4-point scale embedded in the assessment grading tool.



All rubrics are available digitally, in the Assessment and Lesson Resources book, as downloadable PDFs.

Lesson Resources

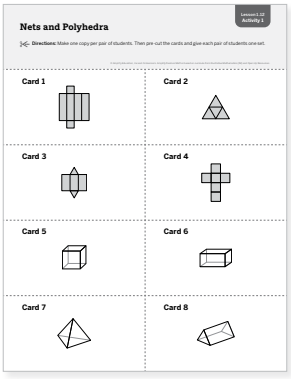
Some Amplify Desmos Math Florida lessons include Lesson Resources in addition to the Teacher and Student edition pages that help make learning more hands-on and collaborative.

Types of Lesson Resources

Each grade includes a variety of Lesson Resources available to teachers and students.

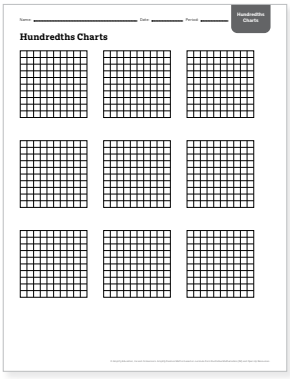
Activity Sheets and Cards

Unit-, lesson-, and activity-specific sheets and cards are provided for hands-on and collaborative learning. Examples include card sorts or sheets with real world data.



Optional Sheets

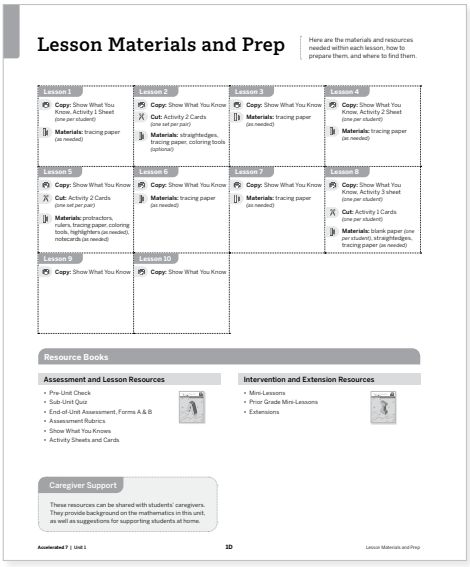
Some lessons contain optional sheets that can be used as needed, such as number lines or hundredths charts.



Preparing Lesson Resources

Use the **Lesson Materials and Prep** pages in the Unit Overview to identify all of the required materials for printing and copying at the unit-level. The pages show which materials need to be cut in advance and which materials will be reused later in lessons.

Additional guidance and optional materials, including materials for students using print when devices are recommended, can be found in **Prep Checklist** of every lesson.



Assessment Resources

Unit 1
Assessments and Rubrics

Name: ..... Date: ..... Period: .....

Pre-Unit Check

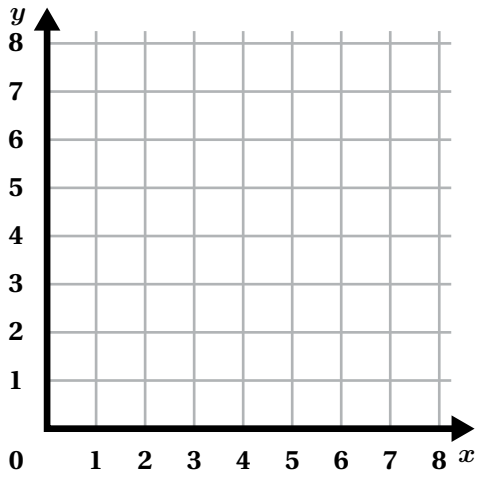
Unit 1

1. What are some things you know about *reflections*?

2. Here are four points.

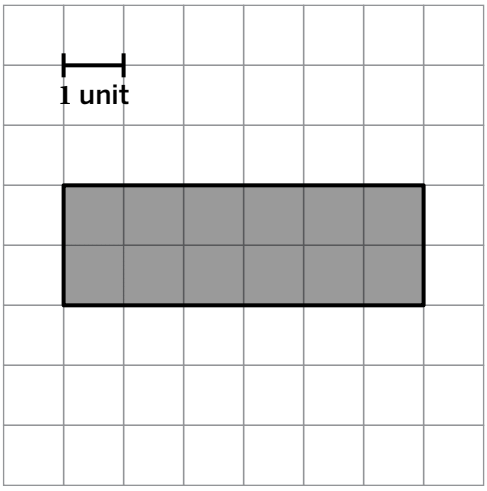
Point	Coordinates
A	$(2, 1)$
B	$(5, 1)$
C	$(7, 2)$
D	$(4, 2)$

a Plot these points on the coordinate plane.



b What is the length of segment CD?

3. Here is a rectangle.



a Determine the *perimeter* of this rectangle.

b Determine the *area* of this rectangle.

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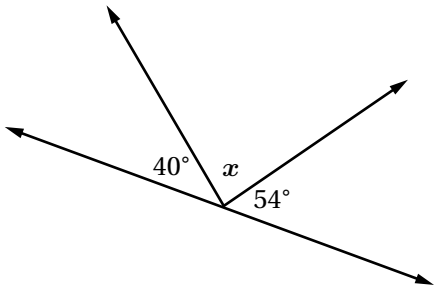
Pre-Unit Check (continued)

4. Determine the measure of angle x.

Explain your thinking.



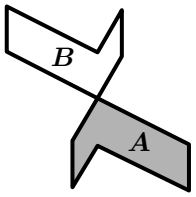
Name: ..... Date: ..... Period: .....

Sub-Unit Quiz

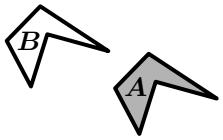
Unit 1

1. In which pair of figures can figure A be rotated onto figure B? Circle one.

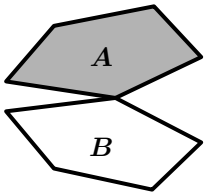
Pair 1



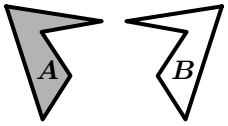
Pair 2



Pair 3



Pair 4

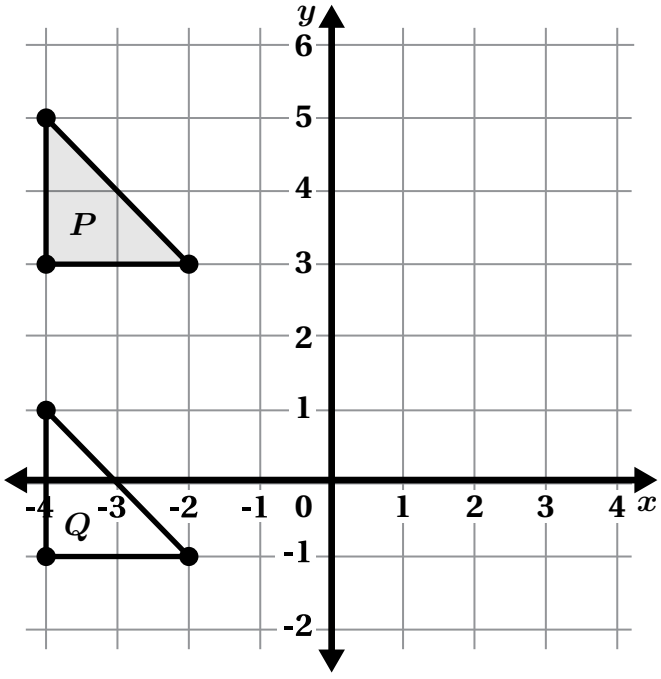


2. Identify the transformation that would move figure P onto figure Q.

(A.) A reflection

(B.) A rotation

(C.) A translation



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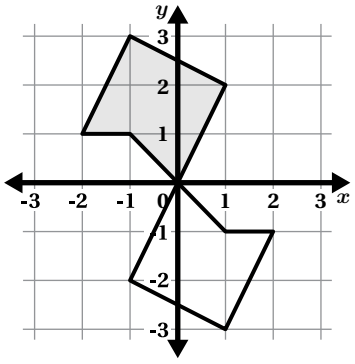
Sub-Unit Quiz (continued)

3. Here are three transformations.

a Which transformation moves figure E onto figure F?

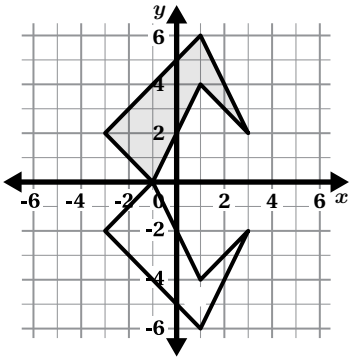


(A.) Translation

(B.) Rotation

(C.) Reflection

b Which transformation moves figure G onto figure H?

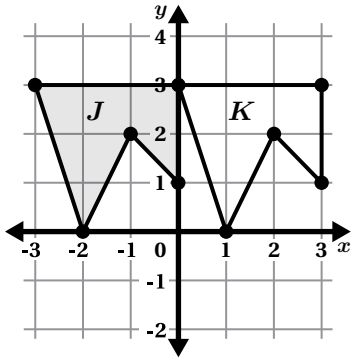


(A.) Translation

(B.) Rotation

(C.) Reflection

c Which transformation moves figure J onto figure K?

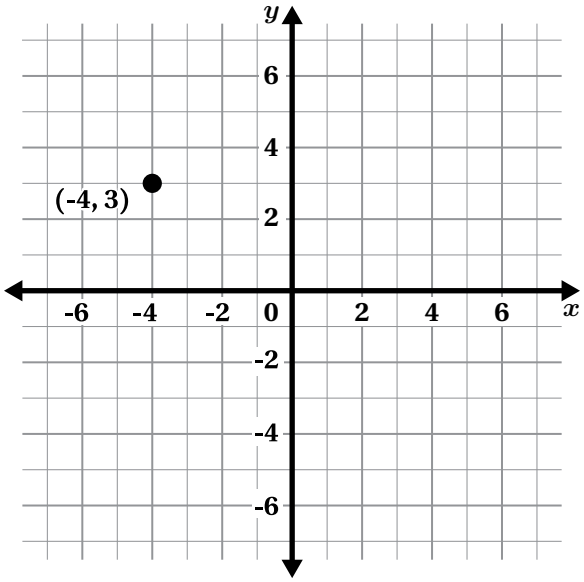


(A.) Translation

(B.) Rotation

(C.) Reflection

4. The point $(-4, 3)$ is shown on the graph. Write the coordinates of $(-4, 3)$ after each transformation.



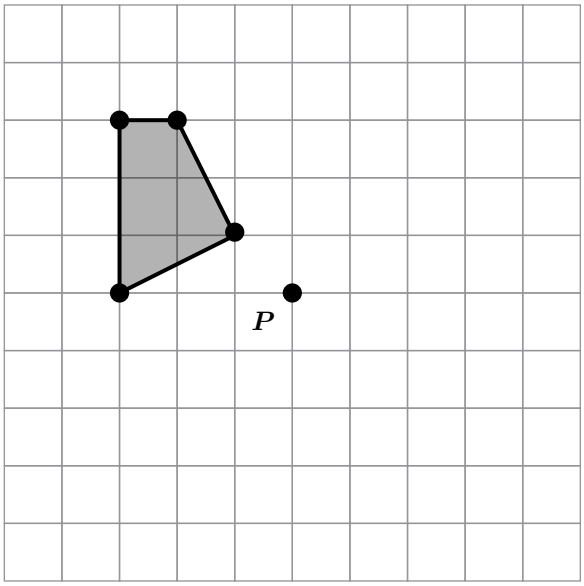
a The image of $(-4, 3)$ after a rotation of $180°$ around point $(0, 0)$.

b The image of $(-4, 3)$ after a translation 2 units to the right.

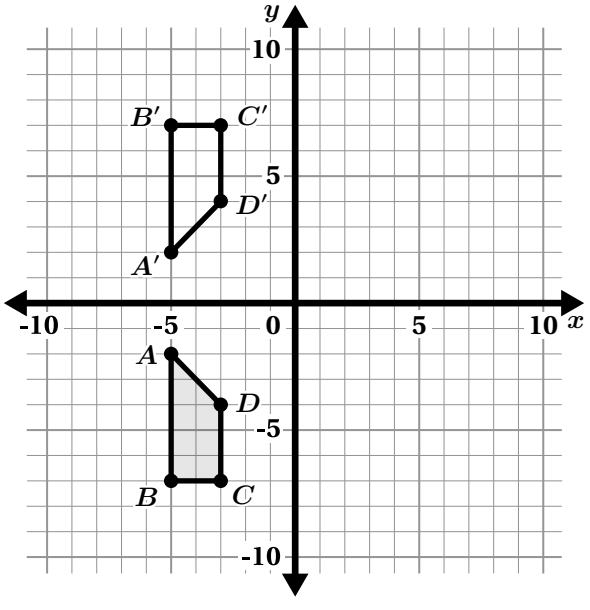
c The image of $(-4, 3)$ after a reflection over the y-axis.

Sub-Unit Quiz (continued)

5. Draw the image of this figure after a 90° clockwise rotation around point P.



6. Describe the transformation that moves figure $ABCD$ onto figure $A'B'C'D'$.



Standard	MA.8.GR.2.1	MA.8.GR.2.3
Problem(s)	1	2, 3a, 3b, 3c, 4a, 4b, 4c, 5, 6

Problem 1

Standard: MA.8.GR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: Pair 1 			**Incorrect** choice. Students who select *Pair 3* may have confused rotations and reflections and may believe the common point between the two figures is the center of a 180° rotation.

Problem 2

Standards: MA.8.GR.2.3, MTR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice and no **incorrect** choices. A translation	**One correct** choice and **one incorrect** choice.	**One correct** choice and **multiple incorrect** choices.	**Incorrect** choice.

Problem 3a

Standard: MA.8.GR.2.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: Rotation			**Incorrect** choice. Students who select *Reflection* may have confused reflection and rotation.

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Problem 3b			**Standard:** MA.8.GR.2.3
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct choice: Reflection			**Incorrect** choice. Students who select *Rotation* may have confused reflection and rotation.

Problem 3c			**Standard:** MA.8.GR.2.3
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct choice: Translation			**Incorrect** choice. Students who select *Rotation* or *Reflection* may need more support understanding transformations.

Problem 4a			**Standards:** MA.8.GR.2.3, MTR.5.1
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response: $(4, -3)$	Response shows **conceptual understanding** with minor errors. E.g., Response includes the correct point sketched, but writes the coordinate incorrectly.	Response shows **incomplete understanding** with significant errors. Students who write $(-4, -3)$, $(4, 3)$, or $(-4, 3)$ may need support writing the coordinates of a point.	Response shows **limited understanding**.

Problem 4b

Standards: MA.8.GR.2.3, MTR.5.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: **(-2,3)**	Response shows **conceptual errors** with minor errors. Students who write $(-6,3)$ may have misunderstood which direction to translate.	Response shows **incomplete understanding** with significant errors. Students who write $(-4,5)$ may have translated incorrectly.	Response shows **limited understanding**.

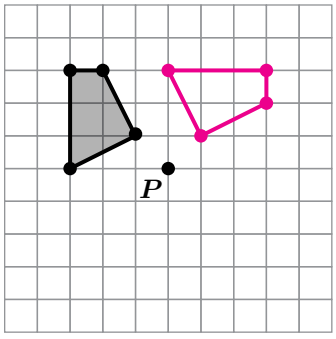
Problem 4c

Standards: MA.8.GR.2.3, MTR.5.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: **(4, 3)**	Response shows **conceptual errors** with minor errors. Students who write $(4,-3)$ may have misunderstood that reflecting over the y-axis affects the x-value.	Response shows **incomplete understanding** with significant errors. Students who write $(4,-3)$ may have thought that y-axis reflections affect the y-value.	Response shows **limited understanding**.

Problem 5

Standard: MA.8.GR.2.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response:  	Response shows **conceptual understanding** with minor errors.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding.**

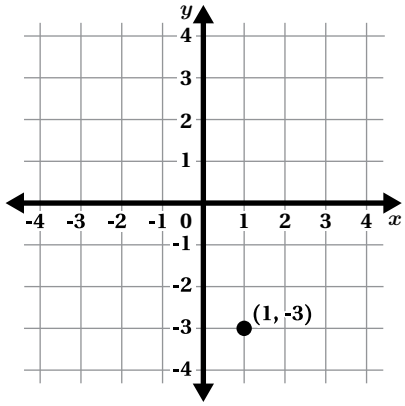
Problem 6			**Standards:** MA.8.GR.2.3, MTR.2.1, MTR.5.1
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response: ***Responses Vary.*** **Reflect figure $ABCD$ over the x-axis.**	Response shows **conceptual errors** with minor errors. Students may describe the correct transformation but include slight miscalculation or wording issues.	Response shows **incomplete understanding** with significant errors. Students may be confused about how to move the points.	Response shows **limited understanding**.

Name: ..... Date: ..... Period: .....

End-of-Unit Assessment

Unit 1

1. The point $(1, -3)$ is shown on the graph.



What are the coordinates of the image of this point after a reflection across the x-axis?

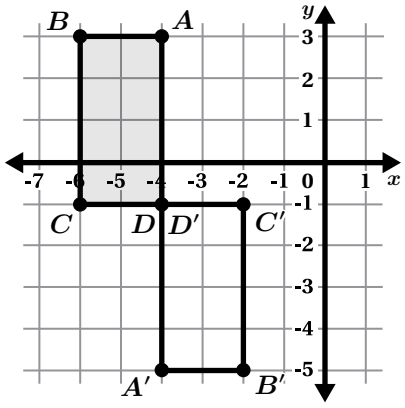
A. (-1, -3)

B. (1, 3)

C. (3, -1)

D. (-3, 1)

2. Figure $ABCD$ was transformed to create figure $A'B'C'D'$. Which transformation took place?



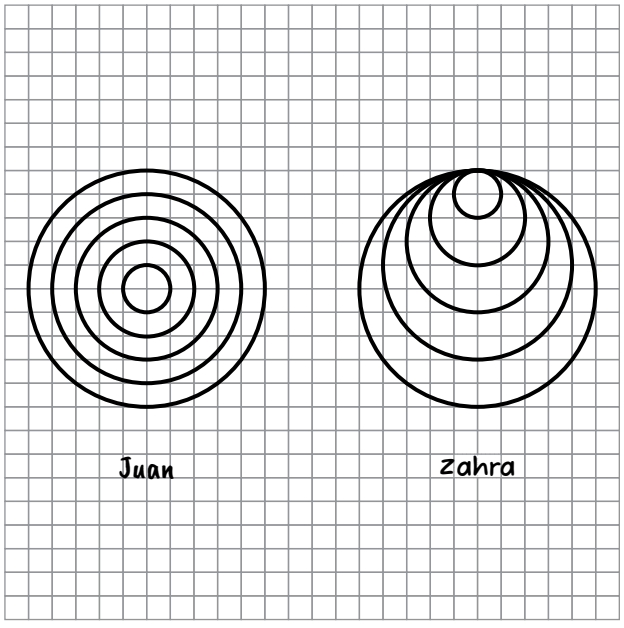
A. A reflection over the x-axis.

B. A reflection over the y-axis.

C. A rotation of about the origin.

D. A rotation of $180°$ about the origin.

3. Juan and Zahra each made a design using five circles.



Select *all* of the true statements.

☐ **A.** The smallest circle in Juan's design is congruent to the smallest circle in Zahra's design.

☐ **B.** Juan's design is congruent to Zahra's design.

☐ **C.** If you translate Juan's design 14 units to the right, you get Zahra's design.

☐ **D.** Each circle in Juan's design has a congruent circle in Zahra's design.

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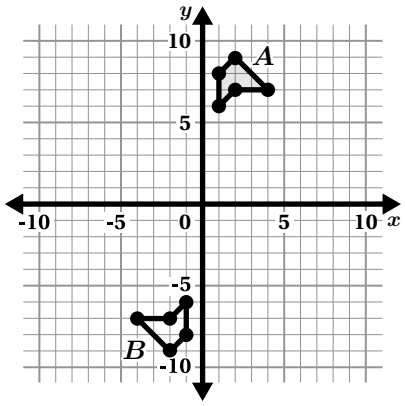
End-of-Unit Assessment (continued)

Unit 1

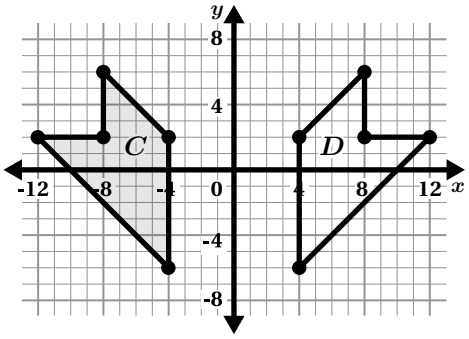
4. Use translations, rotations, or reflections to explain how you know polygon A is congruent to polygon B.



5. Here are two sets of figures.

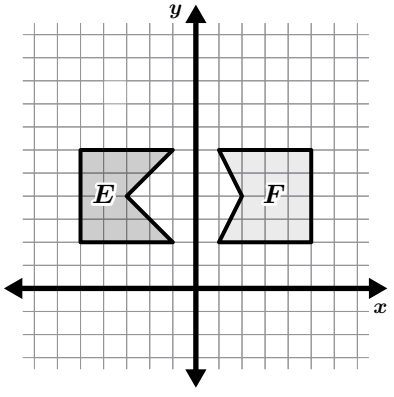
a Is figure C congruent to figure D?

Explain your thinking.



b Is figure E congruent to figure F?

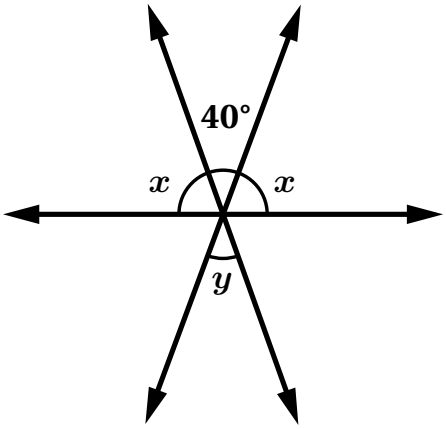
Explain your thinking.



End-of-Unit Assessment (continued)

Unit 1

6. Here is a diagram.

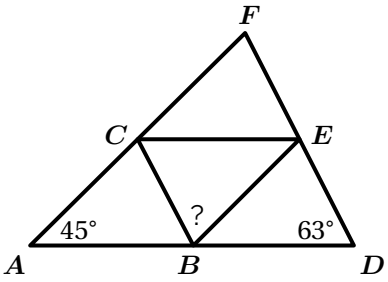


a Determine the values of x and y.

b Haruto wrote the equation $x + y + 40 = 180$. Change Haruto's equation to make it true.

7. To create this diagram:

- Triangle ABC was translated so that point A moved onto point C.
- Triangle ABC was then translated so that point A moved onto point B.



a Identify at least *two pairs* of congruent sides in the figure. Explain how you know they are congruent.

b Name a triangle that is congruent to triangle CBE.

c What is the measure of angle CBE? Show or explain your thinking.

Standard	MA.8.GR.1.5	MA.8.GR.2.1	MA.8.GR.2.3
Problem(s)	7c	3, 7a, 7b	1, 2, 4, 5a, 5b

Problem 1

Standard: MA.8.GR.2.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: $(1, 3)$			**Incorrect** choice. Students who select $(-1, -3)$ may have reflected over the y-axis instead of the x-axis. Students who select $(3, -1)$ or $(-3, 1)$ may have basic misunderstandings about reflections.

Problem 2

Standard: MA.8.GR.2.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: A rotation of $180°$ about the origin.			**Incorrect** choice. Students who select "A reflection over the x-axis" or "A reflection over the y-axis" may not have noticed that the figure's orientation did not change in the way a reflection would cause. Similarly, students who choose "A rotation of $90°$ about the origin may not have recognized that a $90°$ rotation would place the figure in a different quadrant with a different orientation.

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Problem 3

Standard: MA.8.GR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Both correct choices and **no incorrect** choices. • **The smallest circle in Juan's design is congruent to the smallest circle in Zahra's design.** • **Each circle in Juan's design has a congruent circle in Zahra's design.**	**One correct** choice and **no incorrect** choices. **Both correct** choices and **one incorrect** choice.	**One correct** choice and **one incorrect** choice.	**Only incorrect** choices. **Two or more incorrect** choices with **some correct** choices.

Problem 4

Standard: MA.8.GR.2.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: ***Responses Vary.*** **Polygon A is congruent to Polygon B because it can be mapped onto Polygon B using a $180°$ rotation around the origin.**	Response shows **conceptual understanding** with minor errors. The student may describe the correct transformation but omit details (e.g., "it was rotated", without specifying $180°$ or the center of rotation).	Response shows **incomplete understanding** with significant errors. The student may include incorrect transformations (e.g., "it was translated and then reflected") or misunderstand the movement.	Response shows **limited understanding.** The student does not describe any transformation and may state that the polygons are congruent only because they "look the same" without explaining why.

Problem 5a

Standard: MA.8.GR.2.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. **Yes. *Explanations vary.* I can reflect figure C along the y-axis onto figure D.**	Response shows **conceptual understanding** with minor errors.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding**.

Problem 5b

Standard: MA.8.GR.2.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. **No. *Explanations vary.* The figures look congruent, but when figure E is moved on top of figure F using a reflection across the y-axis they do not match up.**	Response shows **conceptual understanding** with minor errors. E.g., Explanation only states figure E is smaller than figure F.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding**.

Problem 6a

Standard: MA.8.GR.1.4

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: **$x = 70$ degrees; $y = 40$ degrees**	Response shows **conceptual understanding** with minor errors. E.g., Response includes an attempt but has a calculation error.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding.**

Problem 6b

Standard: MA.8.GR.1.4

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: **$x + x + 40 = 180$ (or equivalent)**	Response shows **conceptual understanding** with minor errors. E.g., Response includes an attempt but has a calculation error.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding.**

Problem 7a

Standard: MA.8.GR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: *Responses vary.* Side AB is congruent to sides CE and BD because triangle CEF and triangle BDE are images of triangle ABC after a rigid transformation.	Response shows **conceptual understanding** with minor errors. E.g., Response only states side AB is congruent to sides CE and BD.	Response shows **incomplete understanding** with significant errors. E.g., Response states there are four congruent triangles.	Response shows **limited understanding**.

Problem 7b

Standard: MA.8.GR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: *Responses vary.* • Triangle EFC • Triangle BCA • Triangle DEB	Response shows **conceptual understanding** with minor errors.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding**.

Problem 7c

Standard: MA.8.GR.1.5

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. $72°$. *Explanations vary.* The three angles with vertices at B must sum to $180°$ since they make a line. I know that angle EBD is the same measure as angle CAB, $45°$, and angle ABC is the same measure as angle BDE, $63°$. Angle CBE must be $180 - 45 - 63 = 72$.	**Correct** response with **minor flaws** in explanation. **Incorrect** response with logical and **complete explanation**. E.g., Response includes correct explanation with an arithmetic error.	**Correct** response with **incomplete** explanation. E.g., Response includes $72°$ because the angles must add up to $180°$. **Incorrect** response with explanation that shows **partial understanding**. E.g., Response recognizes some of the corresponding angles resulting from the transformations.	**Incorrect** response with **no** explanation.

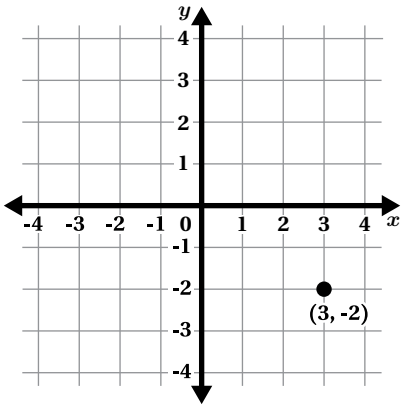
Name: ..... Date: ..... Period: .....

End-of-Unit Assessment

Unit 1

1. The point $(3, -2)$ is shown on the graph.

What are the coordinates of the image of this point after a reflection across the y-axis?



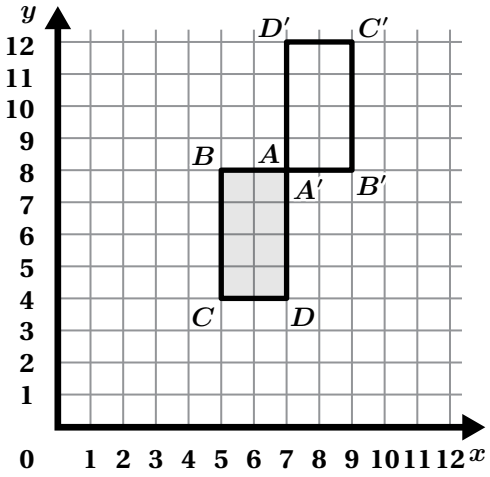
A. (-2, -3)

B. (2, -3)

C. (3, 2)

D. (-3, -2)

2. Figure $ABCD$ was transformed to create figure $A'B'C'D'$. Which transformation took place?



A. A reflection over the x-axis.

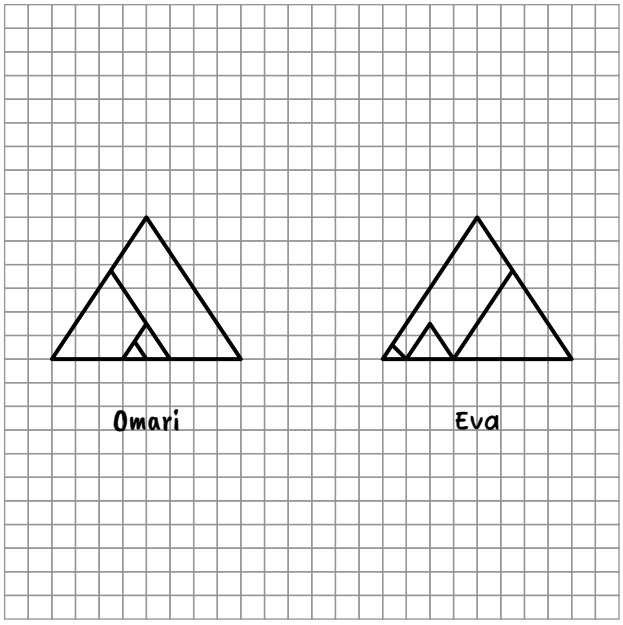
B. A reflection over the y-axis.

C. A rotation of $90°$ about the origin.

D. A rotation of $180°$ about the origin.

3. Omari and Eva each made a design using four triangles.

Select *all* of the true statements.



☐ **A.** The largest triangle in Omari's design is congruent to the largest triangle in Eva's design.

☐ **B.** Each triangle in Omari's design has a congruent triangle in Eva's design.

☐ **C.** If you translate Omari's design 10 units to the right, you get Eva's design.

☐ **D.** Omari's design is congruent to Eva's design.

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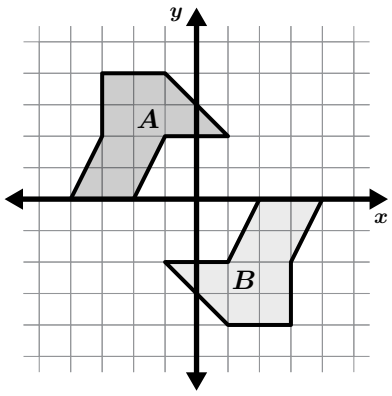
End-of-Unit Assessment (continued)

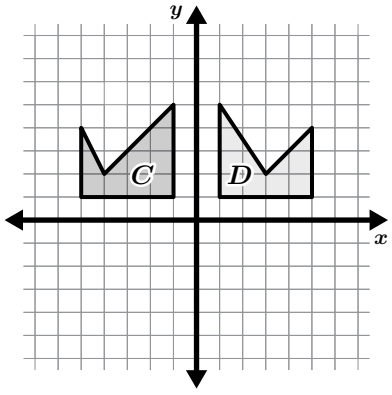
4. Use translations, rotations, or reflections to explain how you know polygon A is congruent to polygon B.



5. Here are two sets of figures.

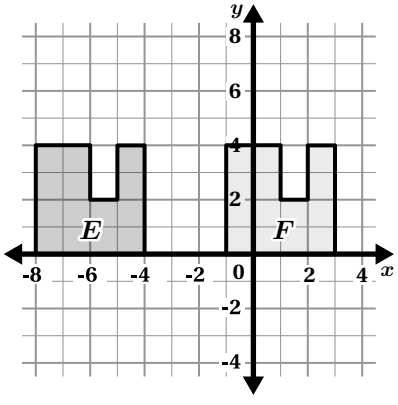
a Is figure C congruent to figure D?

Explain your thinking.



b Is figure E congruent to figure F?

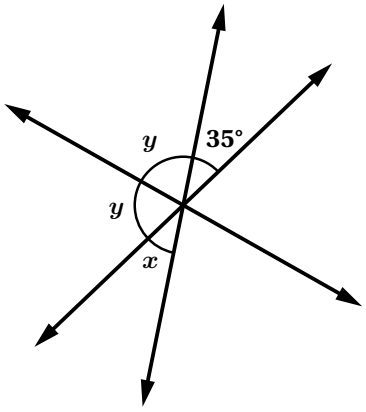
Explain your thinking.



End-of-Unit Assessment (continued)

Unit 1

6. Here is a diagram.

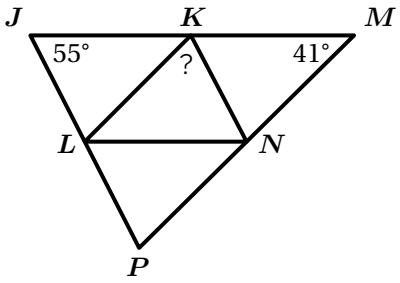


a Determine the values of x and y.

b River wrote the equation $x + y + y + 35 = 180$. Change River's equation to make it true.

7. To create this diagram:

- Triangle JKL was translated so that point J moved onto point L.
- Triangle JKL was then translated so that point J moved onto point K.



a Identify at least *two pairs* of congruent sides in the figure. Explain how you know they are congruent.

b Name a triangle that is congruent to triangle LKN.

c What is the measure of angle LKN? Show or explain your thinking.

Standard	MA.8.GR.1.4	MA.8.GR.2.1	MA.8.GR.2.3
Problem(s)	7c	3, 7a, 7b	1, 2, 4, 5a, 5b

Problem 1

Standard: MA.8.GR.2.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: (-3, -2)			**Incorrect** choice. Students who select $(3, 2)$ may have reflected over the x-axis instead of the y-axis. Students who select $(-2, -3)$ or $(2, -3)$ may have basic misunderstandings about reflections.

Problem 2

Standard: MA.8.GR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: A rotation of $180°$ about the origin.			**Incorrect** choice. Students who select "A reflection over the x-axis" or "A reflection over the y-axis" may not have noticed that the figure's orientation did not change in the way a reflection would cause. Similarly, students who choose "A rotation of $90°$ around point A" may not have recognized that a $90°$ rotation would place the figure in a different quadrant with a different orientation.

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Problem 3

Standard: MA.8.GR.2.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Both correct choices and **no incorrect** choices. • **The largest triangle in Omari's design is congruent to the largest triangle in Eva's design.** • **Each triangle in Omari's design has a congruent triangle in Eva's design.**	**One correct** choice and no incorrect choices. **Both correct** choices and **one incorrect** choice.	**One correct** choice and **one incorrect** choice.	**Only incorrect** choices. **Two or more incorrect** choices with **some correct** choices.

Problem 4

Standard: MA.8.GR.2.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: ***Responses vary.* If polygon A is rotated 180° counterclockwise about the origin, it matches up perfectly with polygon B.**	Response shows **conceptual understanding** with minor errors. E.g., Response includes a translation and/or rotation, but not specifics (translate left, then rotate).	Response shows **incomplete understanding** with significant errors. E.g., Response includes incorrect transformations (it was translated and then it was reflected).	Response shows **limited understanding**. E.g., Response does not include any transformations (they are congruent because they have the same shape).

Problem 5a

Standard: MA.8.GR.2.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. **No. *Explanations vary.* Figure C is not congruent to figure D. The figures look congruent, but when figure C is moved on top of figure D using reflections or rotations, they do not match up.**	**Correct** response with **minor flaws** in explanation. **Incorrect** response with logical and **complete explanation**. E.g., Response includes a sequence of transformations that takes one figure onto the other.	**Correct** response with **incomplete** explanation. E.g., Explanation only states the figures are different. **Incorrect** response with explanation that shows **partial understanding**. E.g., Response includes "They're the same shape."	**Incorrect** response with **no** explanation.

Problem 5b

Standard: MA.8.GR.2.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. ***Yes. Explanations vary.* Figure E is congruent to figure F. I can translate figure E 7 units right onto figure F.**	**Correct** response with **minor flaws** in explanation. E.g., Response references transformations without a specific description. "I can move one onto the other." **Incorrect** response with logical and **complete explanation**. E.g., "If you rotate and then translate figure E, it will not match up with figure D."	**Correct** response with **incomplete** explanation. E.g., Response does not reference the definition of congruence. "They are the same." **Incorrect** response with explanation that shows **partial understanding**.	**Incorrect** response with **no** explanation.

Problem 6a

Standard: MA.8.GR.1.4

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: **$x = 35$ degrees; $y = 52.5$ degrees**	Response shows **conceptual understanding** with minor errors. E.g., Response includes an attempt but has a calculation error.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding.**

Problem 6b

Standard: MA.8.GR.1.4

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: **$x + y + y = 180$ or $35 + y + y = 180$ (or equivalent)**	Response shows **conceptual understanding** with minor errors. E.g., Response includes an attempt but has a calculation error.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding.**

Problem 7a

Standard: MA.8.GR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: **Responses vary. Side JK is congruent to sides LN and KM because triangle LNP and triangle KMN are images of triangle JKL after a rigid transformation.**	Response shows **conceptual understanding** with minor errors. E.g., Response only states side JK is congruent to sides LN and KM.	Response shows **incomplete understanding** with significant errors. E.g., Response states there are four congruent triangles.	Response shows **limited understanding**.

Problem 7b

Standard: MA.8.GR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: ***Responses vary.*** • **Triangle NPL** • **Triangle KLJ** • **Triangle MNK**	Response shows **conceptual understanding** with minor errors.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding**.

Problem 7c

Standard: MA.8.GR.1.4

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. **$84°$. *Explanations vary.* The three angles with vertices at K must sum to $180°$ since they make a line. I know that angle NKM is the same measure as angle LJK, $55°$, and angle JKL is the same measure as angle KMN, $41°$. Angle LKN must be $180 - 55 - 41 = 84$.**	**Correct** response with **minor flaws** in explanation. **Incorrect** response with logical and **complete explanation**. E.g., Response includes correct explanation with an arithmetic error.	Response shows **incomplete understanding** with significant errors. E.g., Response includes 84° because the angles must add up to 180°.	**Incorrect** response with **no** explanation.

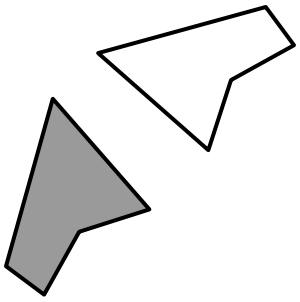
Unit 1
Show What You Know PDFs

Name: Date: Period:

Show What You Know

1.01

Which of these transformations could move the shaded figure onto the unshaded one?



A. Reflection

B. Rotation

C. Translation

Explain your thinking.

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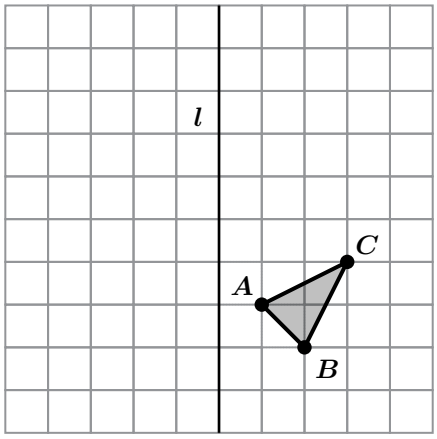
Name: Date: Period:

Show What You Know

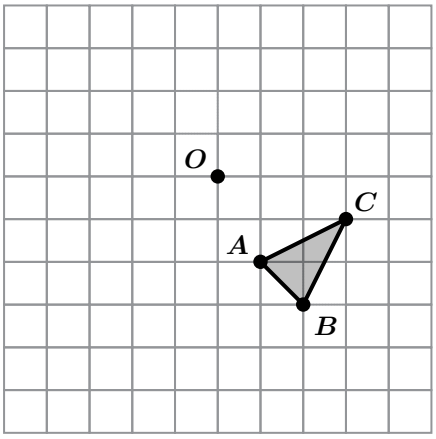
1.02

On each grid, draw and label triangle $A'B'C'$ based on the instructions.

a Reflect triangle ABC over line l.



b Rotate triangle ABC $180°$ clockwise around point O.



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Name: Date: Period:

Show What You Know

1.03

Here are the coordinates of the pre-image and image of triangle CAT. Which transformation moves the pre-image onto the image?

Pre-Image Coordinates	Image Coordinates
$C\,(5, 2)$	$C'\,(5, -2)$
$A\,(-1, 8)$	$A'\,(-1, -8)$
$T\,(4, 0)$	$T'\,(4, 0)$

A. Reflection over the x-axis

B. Reflection over the y-axis

C. Translation 4 units down

D. None of the above

Explain your thinking.

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Name: Date: Period:

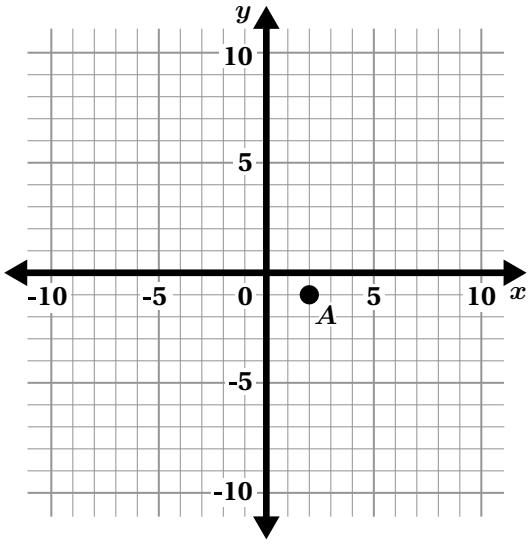
Show What You Know

1.04

Point A is located at $(2, -1)$.

Complete the table.

Pre-Image Coordinates	Transformation	Image Coordinates
$(2, -1)$	Translate point A 2 units to the right	
$(2, -1)$	Reflect point A over the y-axis	
$(2, -1)$	Rotate point A 180° clockwise around $(0, 0)$	



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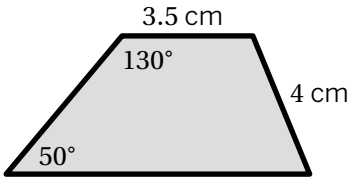
Name: Date: Period:

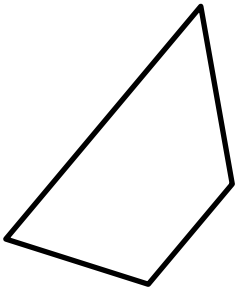
Show What You Know

1.05

The unshaded figure is the image of the shaded figure after a rigid transformation.

Use the information in the pre-image (shaded) to label the measurements of the corresponding parts in the image (unshaded).





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Name: Date: Period:

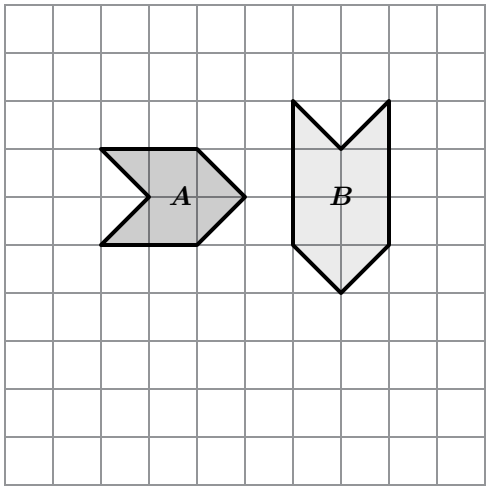
Show What You Know

1.06

Are figures A and B congruent? Circle one.

Yes No

Explain your thinking.



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Name: Date: Period:

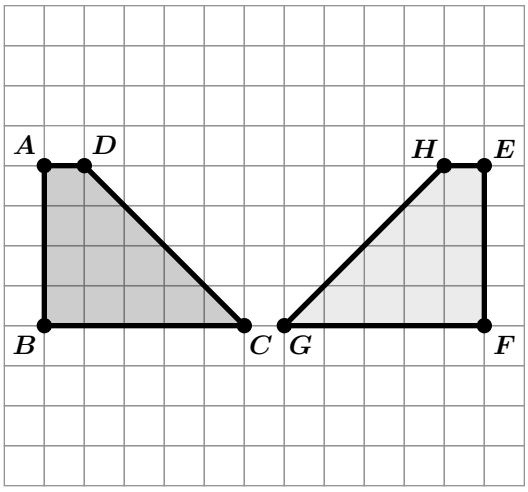
Show What You Know

1.07

Is figure $ABCD$ congruent to figure $EFGH$? Circle one.

Yes No

Explain your thinking.



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Name: Date: Period:

Show What You Know

1.08

Select *three* angle measures that could be angles in the same triangle.

- ☐ **A.** $42°$
- ☐ **B.** $180°$
- ☐ **C.** $90°$
- ☐ **D.** $18°$
- ☐ **E.** $120°$

Explain your reasoning.

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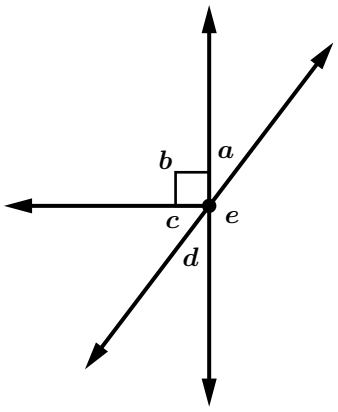
Name: ..... Date: ..... Period: .....

Show What You Know

1.09

1. Using the figure shown,



a Name a pair of complementary angles.

b Name a pair of vertical angles.

c Name a pair of supplementary angles

2. If the measure of angle c is 50 degrees, find the measures of the other angles:

$m\angle a =$ .....

$m\angle b =$ .....

$m\angle d =$ .....

$m\angle e =$ .....

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Name: Date: Period:

Show What You Know

1.10

Dakota says that he can calculate the sum of the interior angle measures of a 16-gon by multiplying $16 \times 180°$. Is he correct or incorrect? Explain or show your thinking. If he is incorrect, determine the correct sum.

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Show What You Know **Lesson 1**

Name: _____ Date: _____ Period: _____

Show What You Know 1.01

Which of these transformations could move the shaded figure onto the unshaded one?

A. Reflection

B. Rotation

C. Translation

Explain your thinking.

Explanations vary. If the shaded figure is reflected over the diagonal line between the two figures, it would move onto the unshaded figure.

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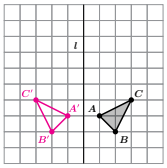
Show What You Know **Lesson 2**

Name: _____ Date: _____ Period: _____

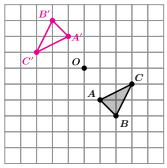
Show What You Know 1.02

On each grid, draw and label triangle $A'B'C'$ based on the instructions.

a. Reflect triangle ABC over line l.



b. Rotate triangle ABC 180° clockwise around point O.



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Show What You Know **Lesson 3**

Name: _____ Date: _____ Period: _____

Show What You Know 1.03

Here are the coordinates of the pre-image and image of triangle CAT. Which transformation moves the pre-image onto the image?

Pre-Image Coordinates	Image Coordinates
C (5, 2)	C' (5, -2)
A (-1, 8)	A' (-1, -8)
T (4, 0)	T' (4, 0)

A. Reflection over the x-axis

B. Reflection over the y-axis

C. Translation 4 units down

D. None of the above

Explain your thinking.

Explanations vary. When reflecting over the x-axis, the sign of the y-coordinate changes.

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Show What You Know **Lesson 4**

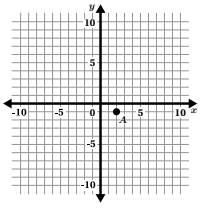
Name: _____ Date: _____ Period: _____

Show What You Know 1.04

Point A is located at (2, -1).

Complete the table.

Pre-Image Coordinates	Transformation	Image Coordinates
(2, -1)	Translate point A 2 units to the right	(4, -1)
(2, -1)	Reflect point A over the y-axis	(-2, -1)
(2, -1)	Rotate point A 180° clockwise around (0, 0)	(-2, 1)



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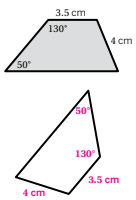
Show What You Know **Lesson 5**

Name: _____ Date: _____ Period: _____

Show What You Know 1.05

The unshaded figure is the image of the shaded figure after a rigid transformation.

Use the information in the pre-image (shaded) to label the measurements of the corresponding parts in the image (unshaded).



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Show What You Know **Lesson 6**

Name: _____ Date: _____ Period: _____

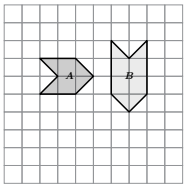
Show What You Know 1.06

Are figures A and B congruent? Circle one.

Yes (No)

Explain your thinking.

Explanations vary. There is no sequence of rigid transformations that will move figure A onto figure B.



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Show What You Know **Lesson 7**

Name: _____ Date: _____ Period: _____

Show What You Know 1.07

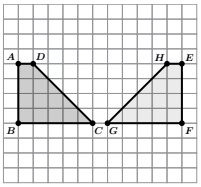
Is figure $ABCD$ congruent to figure $EFGH$? Circle one.

(Yes) No

Explain your thinking.

Explanations vary.

- Figure $ABCD$ is reflected over a vertical line. This moves figure $ABCD$ onto figure $EFGH$.
- The corresponding side lengths and angle measures are equal.



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Show What You Know **Lesson 8**

Name: _____ Date: _____ Period: _____

Show What You Know 1.08

Select *three* angle measures that could be angles in the same triangle.

- ☑ A. 42°
- ☐ B. 180°
- ☐ C. 90°
- ☑ D. 18°
- ☑ E. 120°

Explain your reasoning.

Explanations vary. The three angle measures 42°, 18°, and 120° have a sum of 180 degrees, and all triangles have an interior angle sum of 180 degrees.

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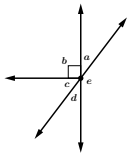
Show What You Know **Lesson 9**

Name: _____ Date: _____ Period: _____

Show What You Know 1.09

1. Using the figure shown,



a. Name a pair of complementary angles.
Angles c and d

b. Name a pair of vertical angles.
Angles a and

c. Name a pair of supplementary angles
Angles a and e

2. If the measure of angle c is 50 degrees, find the measures of the other angles:

$m\angle a =$ $m\angle a = 40°$

$m\angle b =$ $m\angle b = 90°$

$m\angle d =$ $m\angle d = 40°$

$m\angle e =$ $m\angle e = 140°$

Accelerated 7 39

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Show What You Know **Lesson 10**

Name: _____ Date: _____ Period: _____

Show What You Know 1.10

Dakota says that he can calculate the sum of the interior angle measures of a 16-gon by multiplying $16 \times 180°$. Is he correct or incorrect? Explain or show your thinking. If he is incorrect, determine the correct sum.

Responses vary. Dakota is incorrect. He should multiply $(16 - 2) \times 180°$ or $14 \times 180°$ to get the sum of the interior angle measures of a 16-gon. The result is $2520°$.

Accelerated 7 40

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Unit 2
Assessments and Rubrics

Name: ..... Date: ..... Period: .....

Pre-Unit Check

Unit 2

1. A recipe for one loaf of bread uses 2 cups of flour, 12 tablespoons of water, and 1 teaspoon of salt. Complete the table to show the quantities needed for multiple loaves of bread.

Number of Loaves	Flour (cups)	Water (tbsp)	Salt (tsp)
1	2	12	1
2	4		
4		48	

2. Determine the missing value to make each equation true.

a $4 \cdot _____ = 24$

b $24 \cdot _____ = 4$

c $3 \cdot _____ = 12$

d $12 \cdot _____ = 3$

3. Farah, Raine, and Valeria are trying to drink more water.

- Farah drank 3 liters of water yesterday.
- Raine drank $\frac{3}{4}$ as much water as Farah.
- Valeria drank twice as much water as Raine.

Order the names based on how much water was drunk.

Explain your thinking.

	Name
Least	
Greatest	

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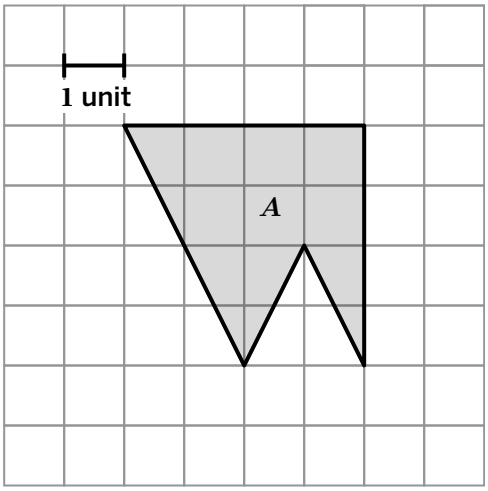
Pre-Unit Check (continued)

Unit 2

4. What is the area of figure A?

Explain or show your thinking.



5. Order these units by length.

1 mile	1 inch	1 yard	1 foot

Least **Greatest**

6. Marine biologists use Wiffle balls in photos to measure corals and other objects. This measurement is a Wiffle.

Complete the table of Wiffles and inches.

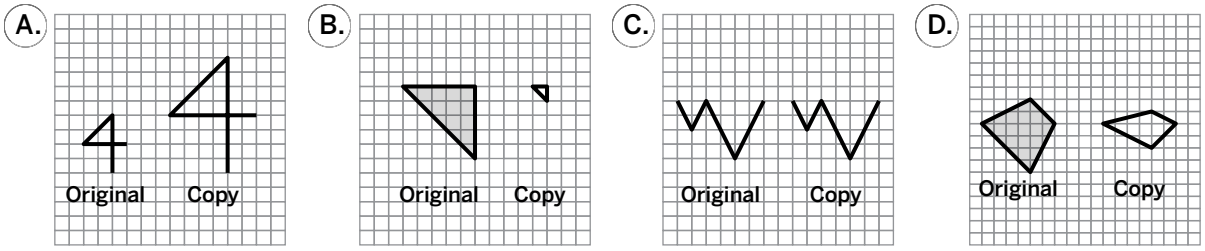
Distance (Wiffles)	Distance (inches)
2	7
	21
3	

Name: Date: Period:

Sub-Unit Quiz 1

Unit 2

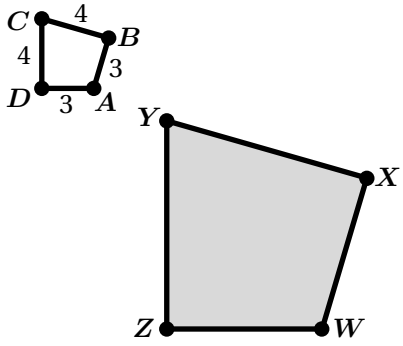
1. Here are pairs of figures, each with an original and a copy.
Which pair shows a *scaled* copy that has a scale factor of less than 1?



2. Figure $WXYZ$ is a scaled copy of figure $ABCD$ with a scale factor of 3.

Select *all* the true statements.

- ☐ **A.** The scale factor from $WXYZ$ to $ABCD$ is $\frac{1}{3}$.
- ☐ **B.** Segment YZ is 7 units long.
- ☐ **C.** If the area of $ABCD$ is 12 square units, then the area of $WXYZ$ is 36 square units.
- ☐ **D.** The distance between W and Y is 3 times the distance between A and C.
- ☐ **E.** The ratio of $\frac{BC}{BA}$ is equivalent to the ratio of $\frac{XY}{XW}$.



All lengths are in grid units.

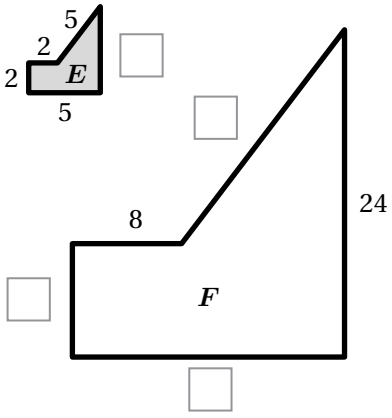
3. Figure F is a scaled copy of figure E.

a Label each missing length.

b What scale factor takes figure E to figure F?

c What scale factor takes figure F back to figure E?

Explain how you know.



All lengths are in grid units.

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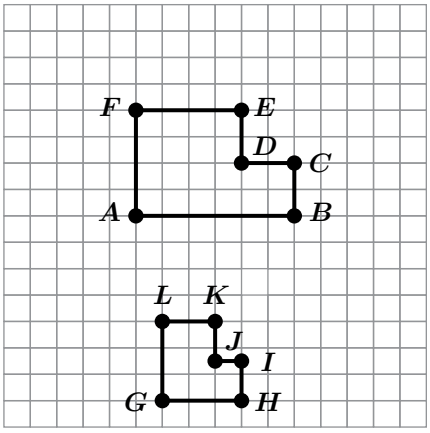
Sub-Unit Quiz 1 (continued)

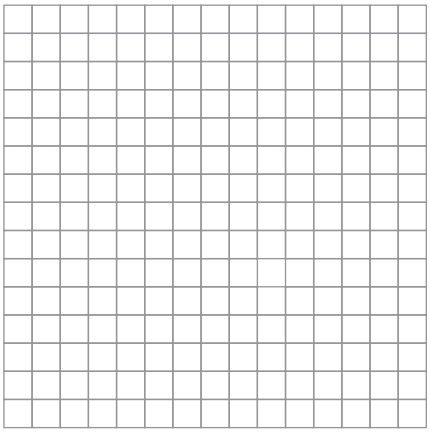
4. Here are figures $ABCDEF$ and $GHIJKL$.



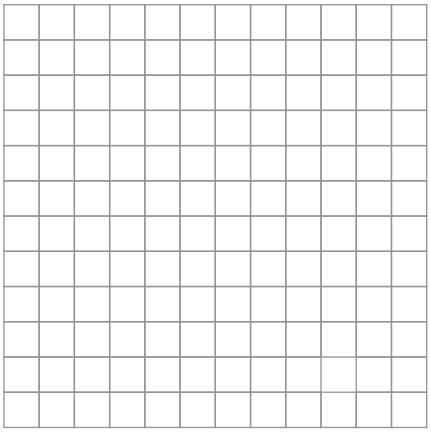
a Are the side lengths in $ABCDEF$ proportional to the side lengths in $GHIJKL$?

Explain how you know.

b Draw a scaled copy of figure $ABCDEF$ using a scale factor of $\frac{3}{2}$.



5. Rectangle S is 3 units by 5 units.



a Draw a scaled copy of rectangle S with an area of 60 square units. Label each side length of the copy.

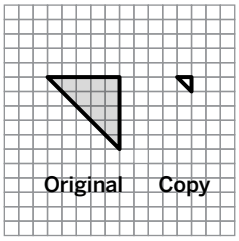
b What is the scale factor between rectangle S and your copy?

Explain how you know.

Standard	MA.7.GR.1.5
Problem(s)	1, 2, 3, 4, 5

Problem 1

Standards: MA.7.GR.1.5, MTR.5.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice:  			**Incorrect** choice. Students who select the pair of identical images may have answered the question "Which scaled copy has a scale factor equal to 1?"

Problem 2

Standard: MA.7.GR.1.5

4 Meeting	3 Approaching	2 Developing	1 Beginning
All correct choices and **no incorrect** choices. • The scale factor from $WXYZ$ to $ABCD$ is $\frac{1}{3}$. • The distance between W and Y is 3 times the distance between A and C. • The ratio of $\frac{BC}{BA}$ is equivalent to the ratio of $\frac{XY}{XW}$.	**One or two correct** choices and **no incorrect** choices. **All correct** choices and **one incorrect** choice.	**One or two correct** choices and **one incorrect** choice.	**Only incorrect** choices. **Two or more incorrect** choices with some correct choices.

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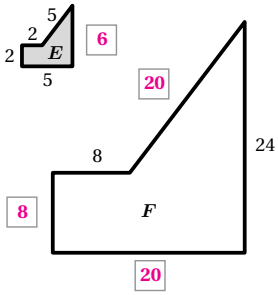
Problem 3a

Standard: MA.7.GR.1.5

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response:  	Response shows **conceptual understanding** with minor errors. **Three out of four** correct lengths.	Response shows **incomplete understanding** with significant errors. **Two out of four** correct lengths.	Response shows **limited understanding**.

Problem 3b

Standard: MA.7.GR.1.5

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: 4	Response shows **conceptual understanding** with minor errors. Students who write $\frac{1}{4}$ (or equivalent) may have answered the question "In order to scale figure F to figure E, what scale factor should you use?"	Response shows **incomplete understanding** with significant errors. Students who write 6 may have subtracted the corresponding side lengths instead of dividing them.	Response shows **limited understanding**.

Problem 3c			Standards: MA.7.GR.1.5, MTR.3.1
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response and **complete** explanation. $\frac{1}{4}$. *Explanations vary.* • The scale factor is $\frac{1}{4}$ because if I multiply each side of figure F by $\frac{1}{4}$, I get the side lengths of figure E. • The ratio of any side length in figure E to the same side length in figure F is $\frac{1}{4}$. This is the scale factor I use to scale figure F back to figure E.	Response shows **conceptual understanding** with minor errors. Students who write 4 may have answered the question "What scale factor takes figure E to figure F?"	Response shows **incomplete understanding** with significant errors. Students who write 6 or -6 may have subtracted the corresponding side lengths instead of dividing them.	Response shows **limited understanding**.

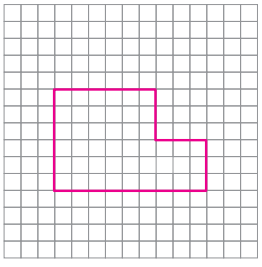
Problem 4a

Standards: MA.7.GR.1.5, MTR.3.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. No. *Explanations vary.* • Even though the width of $EFGH$ is half the width of $ABCD$, its height is not half. So the side lengths of the figures are not proportional. • The side lengths of the figures are not proportional because they don't have equivalent ratios. For example, the widths form a ratio of $\frac{8}{4} = 2$, but the heights form a ratio of $\frac{4}{3}$, which is not equal to 2.	Response shows **conceptual understanding** with minor errors. Students who write "No, they are different shapes" may recognize that scaled copies have dimensions that have a constant ratio with each other.	Response shows **incomplete understanding** with significant errors. Students who write "Yes, they look the same" may recognize that scaled copies have the same shape.	Response shows **limited understanding**.

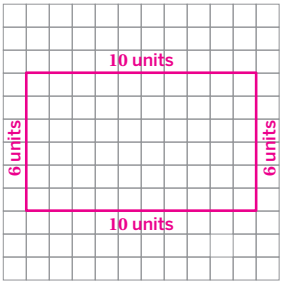
Problem 4b

Standard: MA.7.GR.1.5

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: 	Response shows **conceptual understanding** with minor errors. Students who draw a scaled copy with a scale factor other than $\frac{3}{2}$ may understand the meaning of a scaled copy but made a calculation error.	Response shows **incomplete understanding** with significant errors. Students who draw a similar figure that is not a scaled copy may recognize that scaled copies have the same shape.	Response shows **limited understanding**.

Problem 5a

Standard: MA.7.GR.1.5

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response:  	Response shows **conceptual understanding** with minor errors. Students who draw a rectangle with side lengths 12 units by 20 units may have used a scale factor of 4 because the area of rectangle S multiplied by 4.	Response shows **incomplete understanding** with significant errors. Students who draw a rectangle with side lengths 3 units by 5 units may need support understanding the question.	Response shows **limited understanding**.

Problem 5b

Standards: MA.7.GR.1.5, MTR.4.1

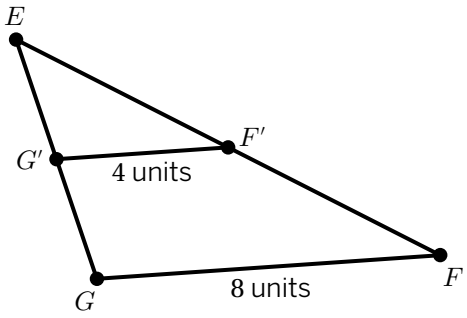
4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. **2. *Explanations vary*. Student response depends on their response in Problem 5a.** **If their response in Problem 5a is correct, here is a sample response: All of the lengths of the scaled copy are twice the lengths of the original figure. For example, the height of the original figure is 3 units, while the height of the scaled copy is $3 \cdot 2 = 6$ units.**	Response shows **conceptual understanding** with minor errors. Students who write 4 Units may have noticed the area of rectangle S multiplied by 4.	Response shows **incomplete understanding** with significant errors. Students who write a value larger than 1 may recognize that the scale factor needs to be larger than 1 to produce a larger copy.	Response shows **limited understanding**.

Name: ..... Date: ..... Period: .....

Sub-Unit Quiz 2

Unit 2

1. Which dilation moves triangle GEF onto triangle $G'EF'$?



A. Center of dilation: point G
Scale factor: 2

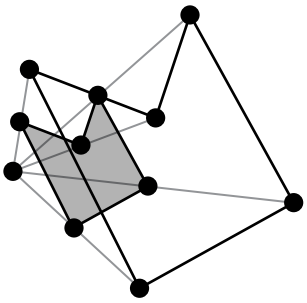
B. Center of dilation: point G
Scale factor: $\frac{1}{2}$

C. Center of dilation: point E
Scale factor: 2

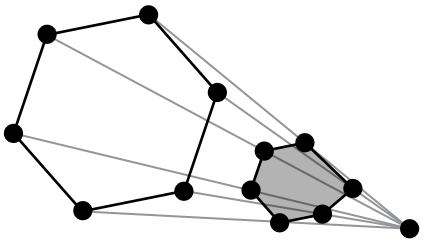
D. Center of dilation: point E
Scale factor: $\frac{1}{2}$

2. Select *all* of the pairs of polygons where the image appears to be the result of a dilation of the pre-image.

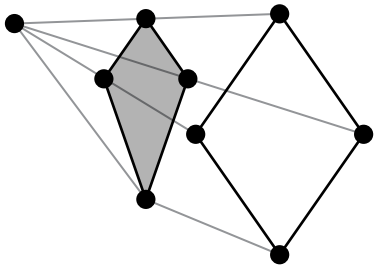
☐ **A.** Pair 1



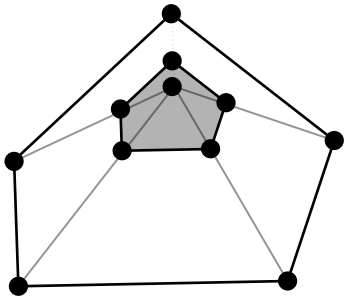
☐ **B.** Pair 2



☐ **C.** Pair 3



☐ **D.** Pair 4



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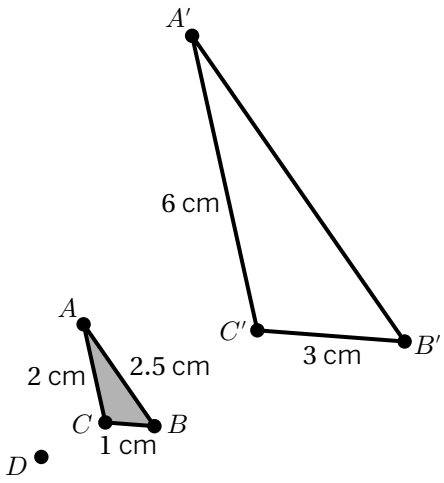
Sub-Unit Quiz 2 (continued)

Unit 2

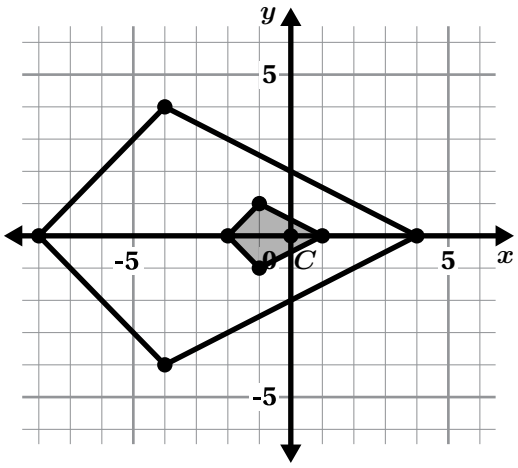
3. Triangle ABC is dilated using point D as the center of dilation and a scale factor to form triangle $A'B'C'$.



a What is the scale factor?

b What is the measurement of side $A'B'$?

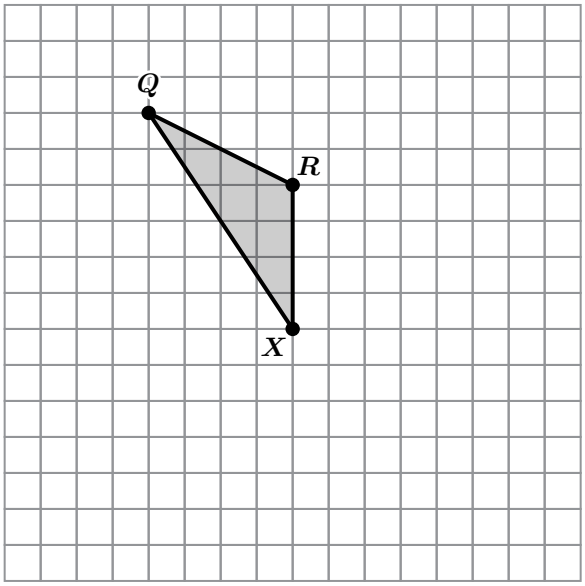
4. Precisely describe a dilation that takes the smaller figure to the larger figure.



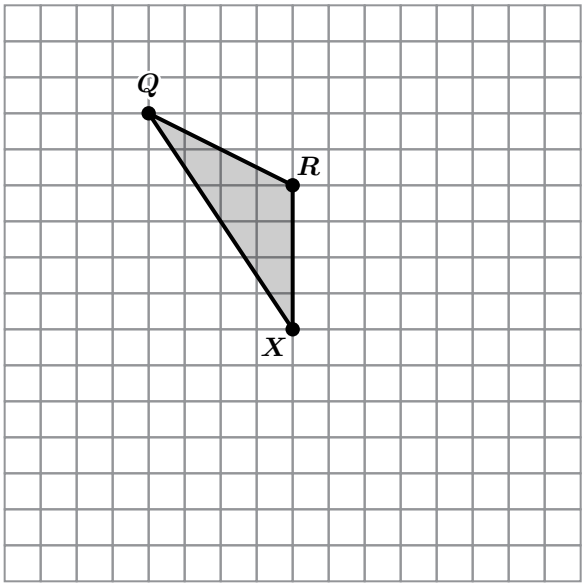
Sub-Unit Quiz 2 (continued)

5. Here is triangle QRX.

a Draw triangle $Q'R'X'$, the image of triangle QRX, after a dilation using point Q as the center of dilation and a scale factor of 2.



b Draw triangle $Q''R''X''$, the image of triangle QRX, after a dilation using point R as the center of dilation and a scale factor of $\frac{1}{4}$, then a translation 4 units to the right.



Standard	MA.8.GR.2.2	MA.8.GR.2,3
Problem(s)	1, 2, 3	4, 5

Problem 1

Standard: MA.8.GR.2.2

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: Center of dilation: point E Scale factor: $\frac{1}{2}$			**Incorrect** choice. Students who select *Center of dilation: point E, Scale factor:* 2 may have confused the image and pre-image.

Problem 2

Standard: MA.8.GR.2.2

4 Meeting	3 Approaching	2 Developing	1 Beginning
Both correct choices and **no incorrect** choices. • Pair 1 • Pair 4	**One correct** choice and **no incorrect** choices. **Both correct** choices and **one incorrect** choice.	**One correct** choice and **one incorrect** choice.	**Only incorrect** choices. **Two or more incorrect** choices with **some correct** choices.

Problem 3a

Standard: MA.8.GR.2.2

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: 3		Response shows **incomplete understanding** with significant errors. E.g., Incorrect scale factor that is larger than 1.	Response shows **limited understanding**.

Problem 3b

Standard: MA.8.GR.2.2

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $A'B'$: 7.5 centimeters	Response shows **conceptual understanding** with minor errors.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding**.

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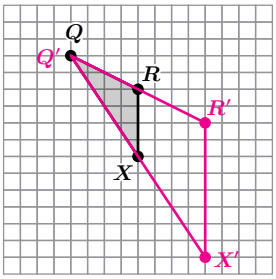
Problem 4

Standard: MA.8.GR.2.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: ***Responses vary.*** **The smaller figure is dilated using point C at the origin as the center of dilation with a scale factor of 4.**	Response shows **conceptual understanding** with minor errors. E.g., Response mentions the correct center of dilation or scale factor, but not both. or references a scale factor of $\frac{1}{4}$.	Response shows **incomplete understanding** with significant errors. E.g., Response includes an incorrect scale factor, such as 2.	Response shows **limited understanding**.

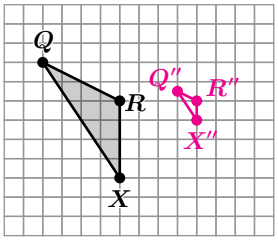
Problem 5a

Standard: MA.8.GR.2.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response:  	Response shows **conceptual understanding** with minor errors. E.g., Response shows correct dilation with a scale factor of 2 but does not use point Q as the center of dilation. E.g., Response includes a minor error dilating one of the points.	Response shows **incomplete understanding** with significant errors. E.g., Response uses point Q as the center of dilation, but with an incorrectly applied scale factor. E.g., Response includes minor errors dilating two or three of the points.	Response shows **limited understanding**.

Problem 5b

Standard: MA.8.GR.2.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response:  	Response shows **conceptual understanding** with minor errors. E.g., Response shows correct dilation with a scale factor of $\frac{1}{4}$ but does not use R as the center of dilation. E.g., Response includes a minor error translating one of the points.	Response shows **incomplete understanding** with significant errors. E.g., Response uses point R as the center of dilation, but with an incorrectly applied scale factor. E.g., Response includes minor errors translating two or three of the points.	Response shows **limited understanding**.

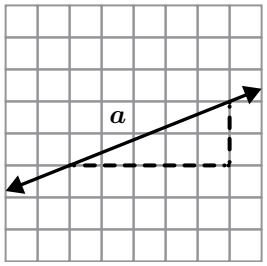
Name: ..... Date: ..... Period: .....

End-of-Unit Assessment

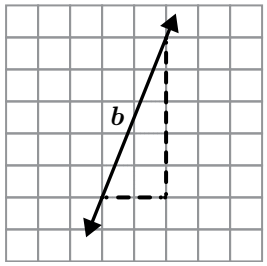
Unit 2

1. Which line has a slope of $\frac{5}{2}$?

A.



B.



C. Both

D. Neither

2. Which statement is *always* true?

A. Dilations of a triangle keep angle measures the same.

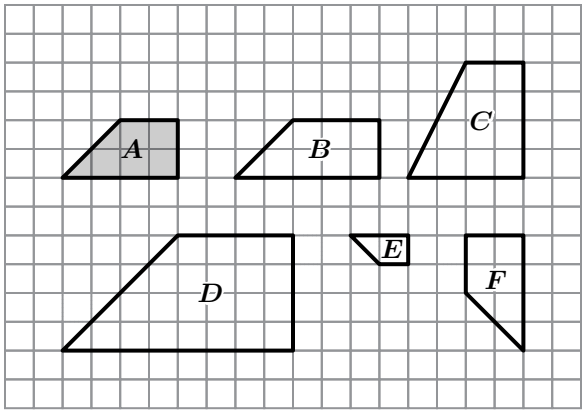
B. Dilations of a triangle keep side lengths the same.

C. Dilations of a triangle must be congruent to the original triangle.

D. Dilations of a triangle always make the sides longer.

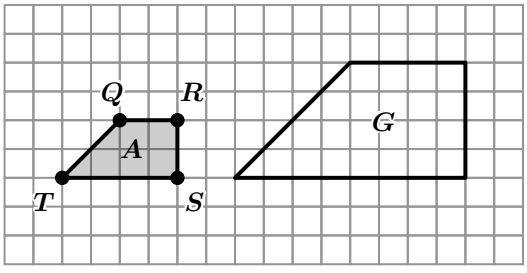
3. Here are several polygons.

a Circle *all* of the polygons that are similar to polygon A.



b Polygon G is similar to polygon A.

Describe a sequence of transformations that moves polygon A to polygon G.



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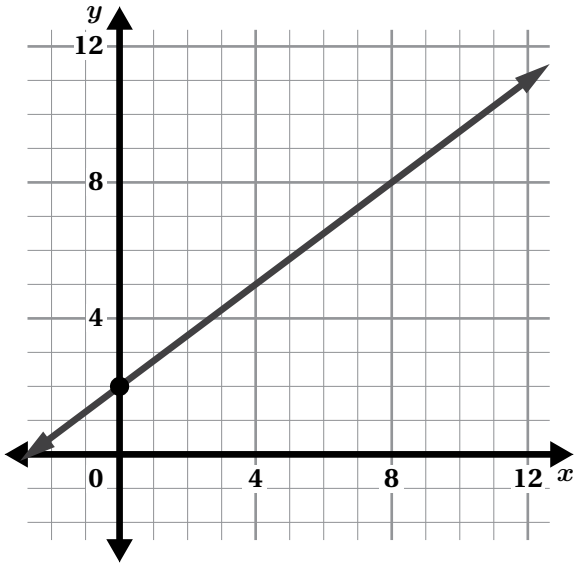
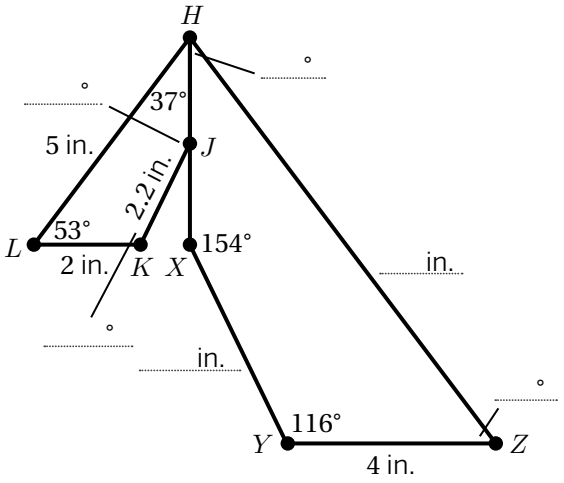
End-of-Unit Assessment (continued)

Unit 2

4. What is the slope of this line?



5. Figure $HJKL$ is similar to figure $HXYZ$.



a Label the missing side and angle measurements in both figures.

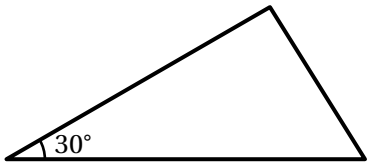
b Precisely describe a sequence of transformations to show that figure $HJKL$ is similar to figure $HXYZ$.

End-of-Unit Assessment (continued)

Unit 2

6. Here is Triangle 1. Triangle 2 also has a $30°$ angle.

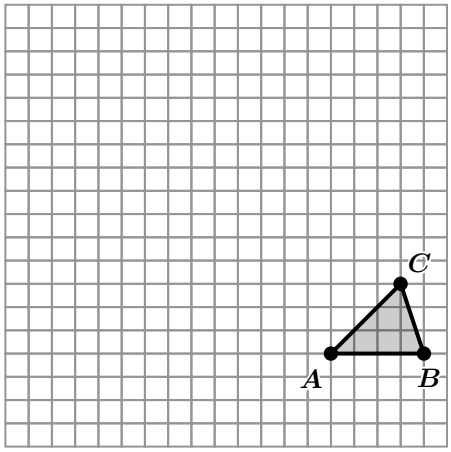
Explain or show why Triangle 1 and Triangle 2 might *not* be similar.



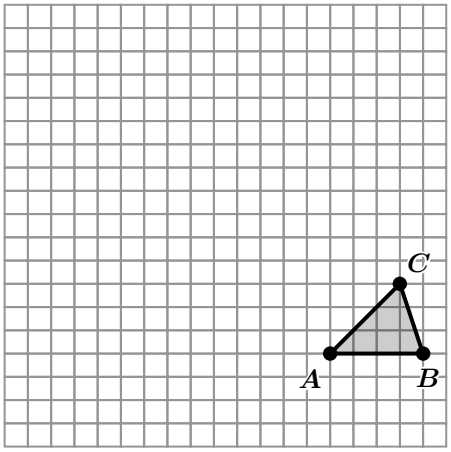
Triangle 1

7. Here is triangle ABC.

a Draw triangle $A'B'C'$, the image of triangle ABC, after a dilation using point B as the center of dilation and a scale factor of 3.



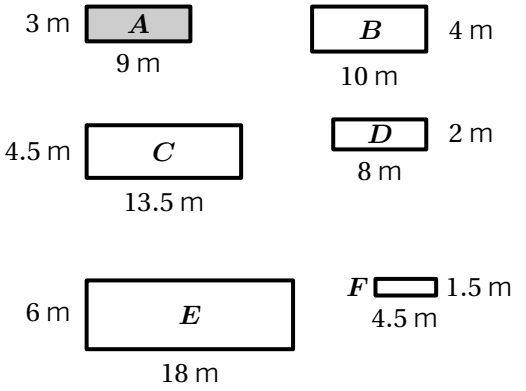
b Draw triangle $A''B''C''$, the image of triangle ABC, after a dilation using point A as the center of dilation and a scale factor of $\frac{1}{2}$.



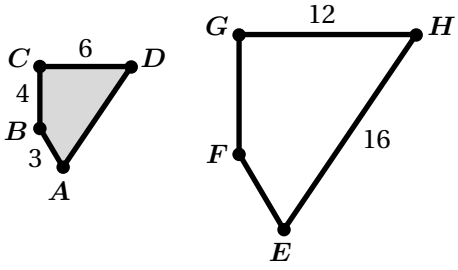
c Explain why triangles $A'B'C'$ and $A''B''C''$ are similar.

End-of-Unit Assessment (continued)

8. Circle *all* the scaled copies of rectangle A.

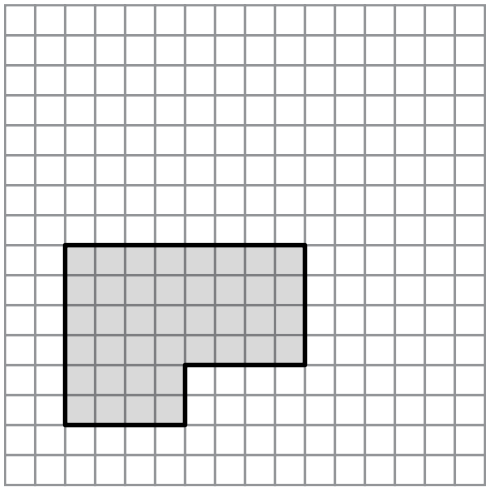


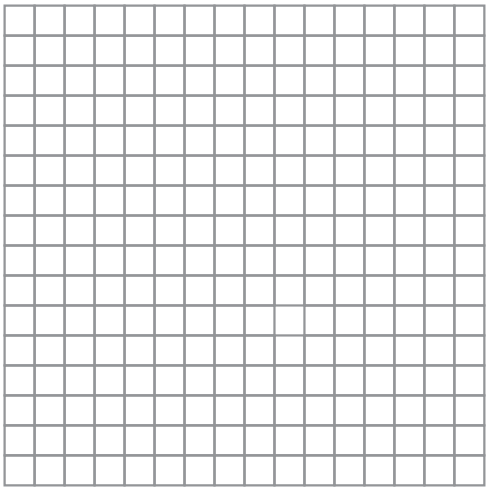
9. Figure $EFGH$ is a scaled copy of figure $ABCD$. Select *all* of the true statements.



- ☐ **A.** Segment EF is twice as long as segment AB.
- ☐ **B.** The ratio of $\frac{AB}{BC}$ is equivalent to the ratio of $\frac{EH}{HG}$.
- ☐ **C.** The scale factor from $EFGH$ to $ABCD$ is 2.
- ☐ **D.** The length of segment AD is 8 units.
- ☐ **E.** The area of $EFGH$ is twice the area of $ABCD$.

10. Draw a scaled copy of the polygon using a scale factor of $\frac{1}{2}$.

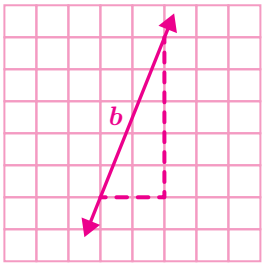




Standard	MA.7.GR.1.5	MA.8.GR.2.2	MA.8.GR.2.3	MA.8.GR.2.4	MA.8.AR.3.2
Problem(s)	8, 9, 10	2, 3, 5a, 7c	5b, 7a, 7b	6	1, 4

Problem 1

Standards: MA.8.AR.3.2, .MTR.5.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice:  			**Incorrect** choice. Students who select line a may have counted the change in x first. Students who select *Both* may have noticed that each slope triangle has sides with lengths 5 units and 2 units.

Problem 2

Standard: MA.8.GR.2.2

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: **Dilations of a triangle keep angle measures the same.**			**Incorrect** choice. Students who select *The image of a triangle after a dilation is congruent to the pre-image* may have confused the word *congruent* with *similar*. Students who select *Dilations of a triangle keep side lengths the same* may have confused sides and angles.

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Problem 3a

Standards: MA.8.GR.2.2, MTR.5.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
All correct choices and **no incorrect** choices. • Polygon D • Polygon E • Polygon F	**One or two correct** choices and **no incorrect** choices. **All correct** choices and **one incorrect** choice. Students who do not say polygon F is similar may not recognize that congruent polygons are similar.	**One or two correct** choices and **one incorrect** choice.	**Only incorrect** choices. **Two or more incorrect** choices with **some correct** choices.

Problem 3b

Standard: MA.8.GR.2.2

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: *Responses vary.* Translate polygon A 10 units right, then dilate polygon A using point S as the center of dilation and a scale factor of 2.	Response shows **conceptual understanding** with minor errors. E.g., Response correctly describes a sequence of transformations but the description of transformations is imprecise, such as, "Dilate polygon A, then translate it to polygon G."	Response shows **incomplete understanding** with significant errors. E.g., Response incorrectly describes a sequence of transformations, such as, "Dilate polygon A using a scale factor of $\frac{1}{2}$."	Response shows **limited understanding**. E.g., Response does not mention any transformations, such as, "Polygon G is the same as polygon A, just a little bit bigger."

Problem 4

Standard: MA.8.AR.3.2

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $\frac{3}{4}$	Response shows **conceptual understanding** with minor errors. E.g., Response states the slope is $\frac{4}{3}$.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding**.

Problem 5a

Standard: MA.8.GR.2.2

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct responses: • $m\angle J$: 154° • $m\angle K$: 116° • XY: 4.4 inches • HZ: 10 inches • $m\angle XHZ$: 37° • $m\angle Z$: 53°	Response shows **conceptual understanding** with minor errors. E.g., Response includes four or five of the correct measurements.	Response shows **incomplete understanding** with significant errors. E.g., Response includes that the angles in figure $HXYZ$ are double the measure of the corresponding angles in figure $HJKL$.	Response shows **limited understanding**.

Problem 5b

Standard: MA.8.GR.2.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: *Responses vary.* Reflect polygon $HJKL$ over line HJ, then dilate using a scale factor of 2 and point H as the center of dilation.	Response shows **conceptual understanding** with minor errors. E.g., Response includes a correct description but does not specify either the center of the dilation or the scale factor.	Response shows **incomplete understanding** with significant errors. E.g., Response describes a reflection or a dilation, but not both.	Response shows **limited understanding**.

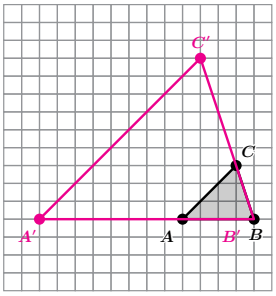
Problem 6

Standards: MA.8.GR.2.4, MTR.4.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: *Responses vary.* For two triangles to be similar, all three pairs of corresponding angles must be congruent. One pair of corresponding angles is 30°, but the remaining angles could be different in each triangle, so the triangles might not be similar.	Response shows **conceptual understanding** with minor errors. E.g., Response includes a minor error in discussing possible angle measurements.	Response shows **incomplete understanding** with significant errors. E.g., Response includes that one pair of congruent corresponding angles is sufficient for similarity.	Response shows **limited understanding**. E.g., Response does not mention any angle relationships.

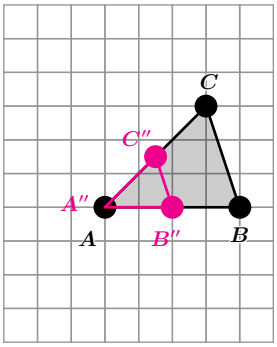
Problem 7a

Standard: MA.8.GR.2.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response:  	Response shows **conceptual understanding** with minor errors. E.g., Response includes a correct dilation with a scale factor of 3 but does not use point B as the center of dilation. E.g., Response includes a minor error dilating one of the points.	Response shows **incomplete understanding** with significant errors. E.g., Response uses point B as the center of dilation, but with an incorrectly applied scale factor. E.g., Response includes minor errors dilating two or three of the points.	Response shows **limited understanding**.

Problem 7b

Standard: MA.8.GR.2.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response:  	Response shows **conceptual understanding** with minor errors. E.g., Response includes a correct dilation with a scale factor of $\frac{1}{2}$ but does not use point A as the center of dilation. E.g., Response includes a minor error dilating one of the points.	Response shows **incomplete understanding** with significant errors. E.g., Response uses point A as the center of dilation, but with an incorrectly applied scale factor. E.g., Response includes minor errors dilating two or three of the points.	Response shows **limited understanding**.

Problem 7c

Standard: MA.8.GR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: ***Responses vary.*** **If triangle $A'B'C'$ is dilated using point B as the center of dilation and a scale factor of $\frac{1}{3}$, the result is triangle ABC. If triangle ABC is then dilated using point A as the center of dilation and a scale factor of $\frac{1}{2}$, the result is triangle $A''B''C''$.**	Response shows **conceptual understanding** with minor errors. E.g., Response includes that triangles $A'B'C'$ and $A''B''C''$ are dilations of each other, but without a justification such as referencing triangle ABC.	Response shows **incomplete understanding** with significant errors. E.g., Response includes dilations but is not clear.	Response shows **limited understanding**.

Problem 8

Standard: MA.7.GR.1.5

4 Meeting	3 Approaching	2 Developing	1 Beginning
All correct choices and **no incorrect** choices. • **Rectangle C** • **Rectangle E** • **Rectangle F**	**One or two correct** choices and **no incorrect** choices. **All correct** choices and **one incorrect** choice.	**One or two correct** choices and **one incorrect** choice.	**Only incorrect** choices. **Two or more incorrect** choices with some correct choices.

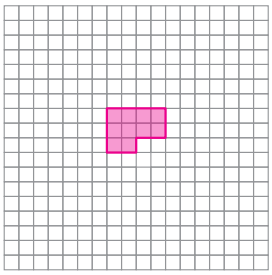
Problem 9

Standard: MA.7.GR.1.5

4 Meeting	3 Approaching	2 Developing	1 Beginning
Both correct choices and **no incorrect** choices. • **Segment EF is twice as long as segment AB.** • **The length of segment AD is 8 units.**	**One correct** choice and **no incorrect** choices. **Both correct** choices and **one incorrect** choice.	**One correct** choice and **one incorrect** choice.	**Only incorrect** choices. **Two or more incorrect** choices with some correct choices.

Problem 10

Standards: MA.7.GR.1.5, MTR.5.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: A scaled copy of the polygon with a scale factor of $\frac{1}{2}$. 	Response shows **conceptual understanding** with minor errors. E.g., Response includes minor errors in determining the dimensions of the figure, such as a pair of segments 1 unit longer than they should be.	Response shows **incomplete understanding** with significant errors. Students who draw a scaled copy that is larger than the original may not recognize that a scale factor between 0 and 1 is a reduction.	Response shows **limited understanding**. E.g., Response includes adding or subtracting $\frac{1}{2}$ to the length of each side.

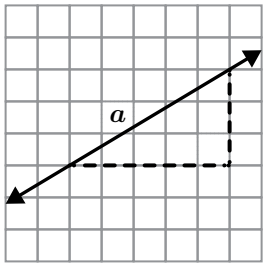
Name: ..... Date: ..... Period: .....

End-of-Unit Assessment

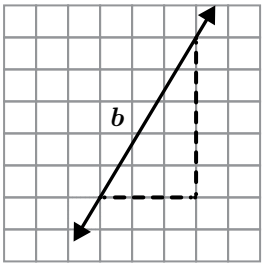
Unit 2

1. Which line has a slope of $\frac{3}{5}$?

A.



B.



C. Both

D. Neither

2. Which statement is *not* true?

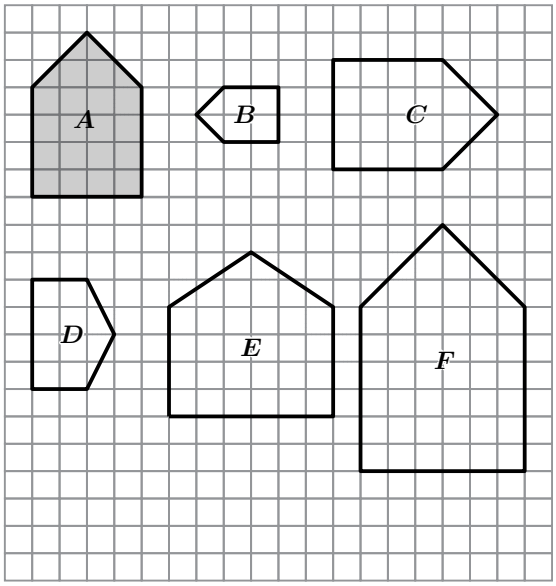
A. Dilations of a line are always parallel to the original line.

B. Dilations of a triangle are always similar to the original triangle.

C. Dilations always keep side lengths the same.

D. Dilations always keep angle measures the same.

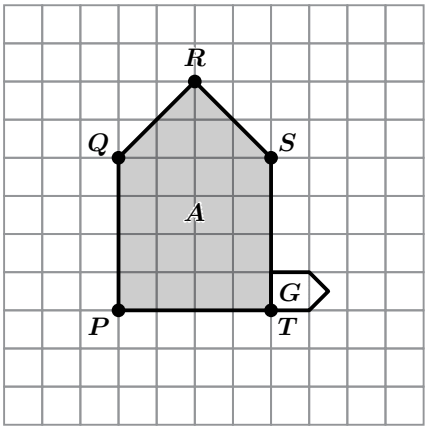
3. Here are several polygons.



a Circle *all* of the polygons that are similar to polygon A.

b Polygon G is similar to polygon A.

Describe a sequence of transformations that moves polygon A to polygon G.



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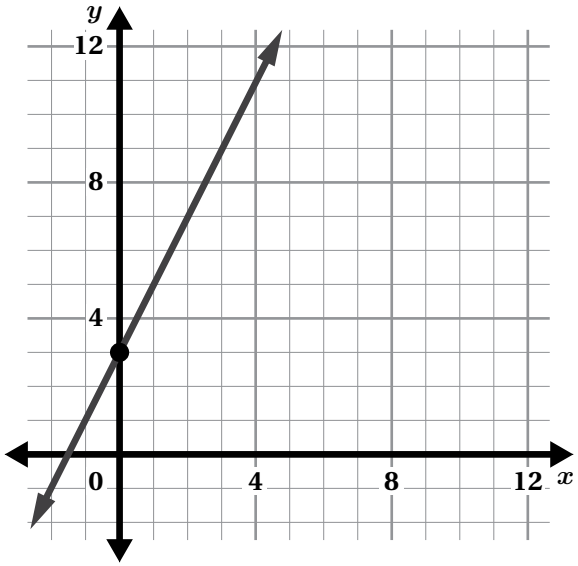
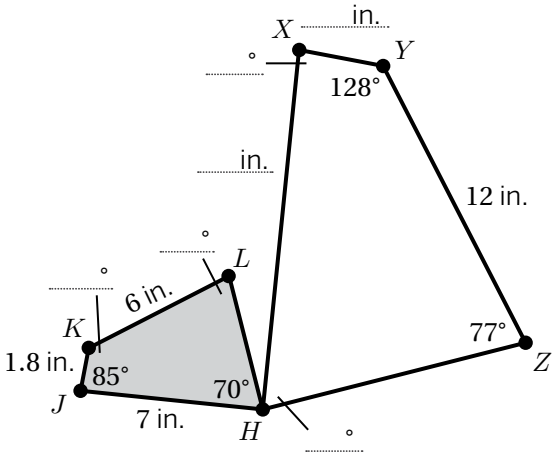
End-of-Unit Assessment (continued)

4. What is the slope of this line?



5. Figure $HJKL$ is similar to figure $HXYZ$.



a Label the missing side and angle measurements in both figures.

b Precisely describe a sequence of transformations to show that figure $HJKL$ is similar to figure $HXYZ$.

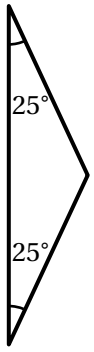
End-of-Unit Assessment (continued)

Unit 2

6. Here is Triangle 1. Triangle 2 also has two 25° angles.

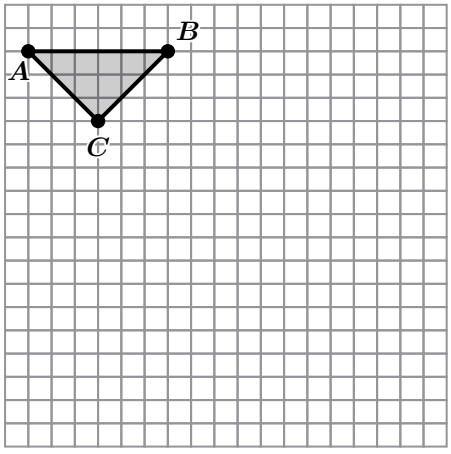
Explain or show why Triangle 1 and Triangle 2 must be similar.

Triangle 1

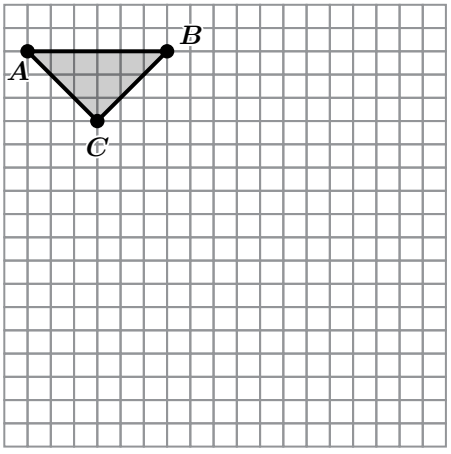


7. Here is triangle ABC.

a Draw triangle $A'B'C'$, the image of triangle ABC, after a dilation using point A as the center of dilation and a scale factor of 2.



b Draw triangle $A''B''C''$, the image of triangle ABC, after a dilation using point C as the center of dilation and a scale factor of $\frac{1}{3}$.

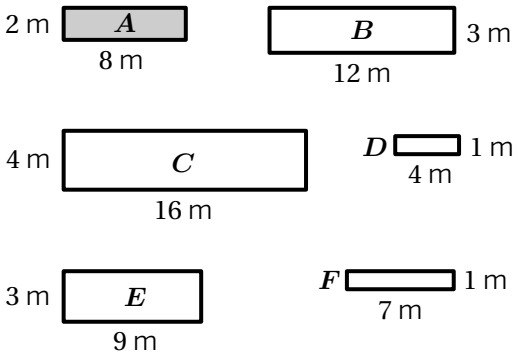


c Explain why triangles $A'B'C'$ and $A''B''C''$ are similar.

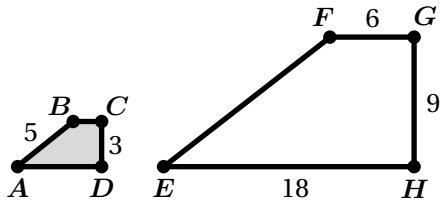
End-of-Unit Assessment (continued)

Unit 2

8. Circle *all* the scaled copies of rectangle A.

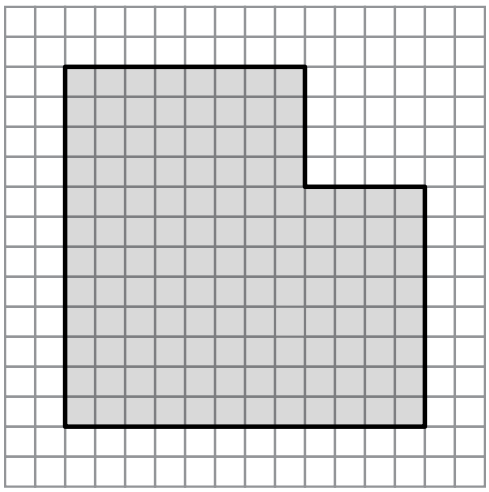


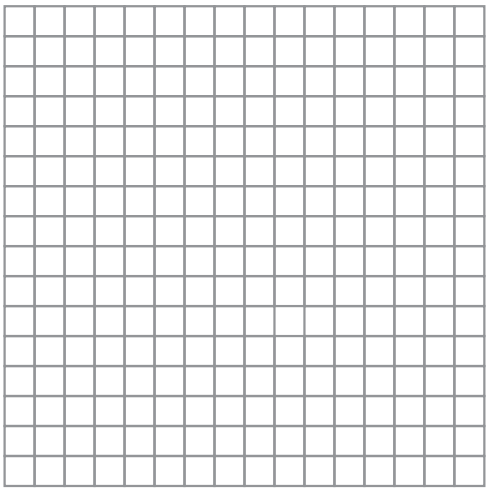
9. Figure $EFGH$ is a scaled copy of figure $ABCD$. Select *all* of the true statements.



- ☐ **A.** Segment GH is three times as long as segment AB.
- ☐ **B.** The ratio of $\frac{AB}{BC}$ is equivalent to the ratio of $\frac{EF}{FG}$.
- ☐ **C.** The scale factor from $EFGH$ to $ABCD$ is $\frac{1}{3}$.
- ☐ **D.** The length of segment BC is 2 units.
- ☐ **E.** The area of $EFGH$ is three times the area of $ABCD$.

10. Draw a scaled copy of the polygon using a scale factor of $\frac{1}{4}$.

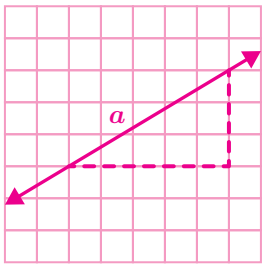




Standard	MA.7.GR.1.5	MA.8.GR.2.2	MA.8.GR.2.3	MA.8.GR.2.4	MA.8.AR.3.2
Problem(s)	8, 9, 10	2, 3, 5a, 7c	5b, 7a, 7b	6	1, 4

Problem 1

Standards: MA.8.AR.3.2, MTR.5.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice:  			**Incorrect** choice. Students who select line b may have counted the change in x first. Students who select *Both* may have noticed that each slope triangle has sides with lengths 3 units and 5 units.

Problem 2

Standard: MA.8.GR.2.2

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: **Dilations always keep side lengths the same.**			**Incorrect** choice. Students who select *The image of a line after a dilation is always parallel to the original line* may have confused the word *parallel* with *perpendicular*. Students who select *Dilations always keep angle measures the same* may have confused sides and angles.

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Problem 3a

Standards: MA.8.GR.2.2, MTR.5.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
All correct choices and **no incorrect** choices. • Polygon B • Polygon C • Polygon F	**One or two correct** choices and **no incorrect** choices. **All correct** choices and **one incorrect** choice. Students who do not say polygon C is similar may not recognize that congruent polygons are similar.	**One or two correct** choices and **one incorrect** choice.	**Only incorrect** choices. **Two or more incorrect** choices with **some correct** choices.

Problem 3b

Standard: MA.8.GR.2.2

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: ***Responses vary.*** **Rotate polygon A $90°$ clockwise around point T, then dilate polygon using a scale factor of $\frac{1}{4}$ and point T as the center of dilation.**	Response shows **conceptual understanding** with minor errors. E.g., Response correctly describes a sequence of transformations but the description of transformations is imprecise, such as, "Rotate polygon A, then dilate it."	Response shows **incomplete understanding** with significant errors. E.g., Response incorrectly describes a sequence of transformations, such as, "Dilate polygon A with a scale factor of $\frac{1}{4}$," or, "Rotate polygon A."	Response shows **limited understanding**. E.g., Response does not mention any transformations, such as, "Polygon G is the same as polygon A, just a little bit smaller."

Problem 4

Standard: MA.8.AR.3.2

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: **2**	Response shows **conceptual understanding** with minor errors. E.g., Response states the slope is $\frac{1}{2}$.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding**.

Problem 5a

Standard: MA.8.GR.2.2

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct responses: • $m\angle K$: 128° • $m\angle L$: 77° • XY: 3.6 inches • HX: 14 inches • $m\angle X$: 85° • $m\angle ZHX$: 70°	Response shows **conceptual understanding** with minor errors. E.g., Response includes four or five of the correct measurements.	Response shows **incomplete understanding** with significant errors. E.g., Response includes that the angles in figure $HXYZ$ are double the measure of the corresponding angles in figure $HJKL$.	Response shows **limited understanding**.

Problem 5b

Standard: MA.8.GR.2.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: Responses vary. Rotate polygon $HJKL$ 90° clockwise around point H, then dilate it by a scale factor of 2 using point H as the center of dilation.	Response shows **conceptual understanding** with minor errors. E.g., Response includes a correct description but does not specify either the center of the dilation or the scale factor.	Response shows **incomplete understanding** with significant errors. E.g., Response describes a rotation or a dilation, but not both.	Response shows **limited understanding**.

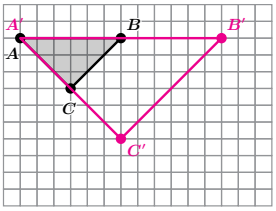
Problem 6

Standards: MA.8.GR.2.4, MTR.4.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: *Responses vary.* For two triangles to be similar, all three pairs of corresponding angles must be congruent. Two pairs of corresponding angles are 25°, and the angles in each triangle must sum to 180°, so the third pair of corresponding angles are both 130°.	Response shows **conceptual understanding** with minor errors. E.g., Response includes a minor error in discussing possible angle measurements.	Response shows **incomplete understanding** with significant errors. E.g., Response includes that one pair of congruent corresponding angles is sufficient for similarity.	Response shows **limited understanding**. E.g., Response does not mention any angle relationships.

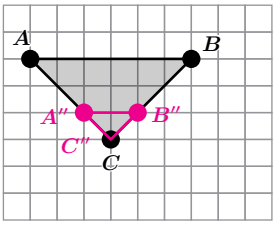
Problem 7a

Standards: MA.8.GR.2.3, MTR.5.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response:  	Response shows **conceptual understanding** with minor errors. E.g., Response includes a correct dilation with a scale factor of 2 but does not use point A as the center of dilation. E.g., Response includes a minor error dilating one of the points.	Response shows **incomplete understanding** with significant errors. E.g., Response uses point A as the center of dilation, but with an incorrectly applied scale factor. E.g., Response includes minor errors dilating two or three of the points.	Response shows **limited understanding**.

Problem 7b

Standards: MA.8.GR.2.3, MTR.4.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response:  	Response shows **conceptual understanding** with minor errors. E.g., Response includes a correct dilation with a scale factor of $\frac{1}{3}$ but does not use point C as the center of dilation. E.g., Response includes a minor error dilating one of the points.	Response shows **incomplete understanding** with significant errors. E.g., Response uses point C as the center of dilation, but with an incorrectly applied scale factor. E.g., Response includes minor errors dilating two or three of the points.	Response shows **limited understanding**.

Problem 7c

Standards: MA.8.GR.2.2, MTR.5.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: *Responses vary.* If triangle $A'B'C'$ is dilated using point A as the center of dilation and a scale factor of 2, the result is triangle ABC. If triangle ABC is then dilated using point C as the center of dilation and a scale factor of $\frac{1}{3}$, the result is triangle $A''B''C''$.	Response shows **conceptual understanding** with minor errors. E.g., Response includes that triangles $A'B'C'$ and $A''B''C''$ are dilations of each other, but without a justification such as referencing triangle ABC.	Response shows **incomplete understanding** with significant errors. E.g., Response includes dilations but is not clear.	Response shows **limited understanding**.

Problem 8

Standard: MA.7.GR.1.5

4 Meeting	3 Approaching	2 Developing	1 Beginning
All correct choices and **no incorrect** choices. • Rectangle B • Rectangle C • Rectangle D	**One or two correct** choices and **no incorrect** choices. **All correct** choices and **one incorrect** choice.	**One or two correct** choices and **one incorrect** choice.	**Only incorrect** choices. **Two or more incorrect** choices with some correct choices.

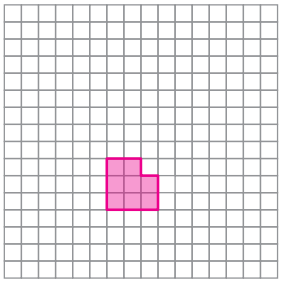
Problem 9

Standard: MA.7.GR.1.5

4 Meeting	3 Approaching	2 Developing	1 Beginning
All correct choices and **no incorrect** choices. • The ratio of $\frac{AB}{BC}$ is equivalent to the ratio of $\frac{EF}{FG}$. • The scale factor from $EFGH$ to $ABCD$ is $\frac{1}{3}$. • The length of segment BC is 2 units.	**One or two correct** choices and **no incorrect** choices. **All correct** choices and **one incorrect** choice.-	**One or two correct** choices and **one incorrect** choice.	**Only incorrect** choices. **Two or more incorrect** choices with some correct choices.

Problem 10

Standards: MA.7.GR.1.5, MTR.5.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: A scaled copy of the polygon with a scale factor of $\frac{1}{4}$. 	Response shows **conceptual understanding** with minor errors. E.g., Response includes minor errors in determining the dimensions of the figure, such as a pair of segments 1 unit longer than they should be.	Response shows **incomplete understanding** with significant errors. Students who draw a scaled copy that is larger than the original may not recognize that a scale factor between 0 and 1 is a reduction.	Response shows **limited understanding**. E.g., Response includes adding or subtracting $\frac{1}{4}$ to the length of each side.

Unit 2
Show What You Know PDFs

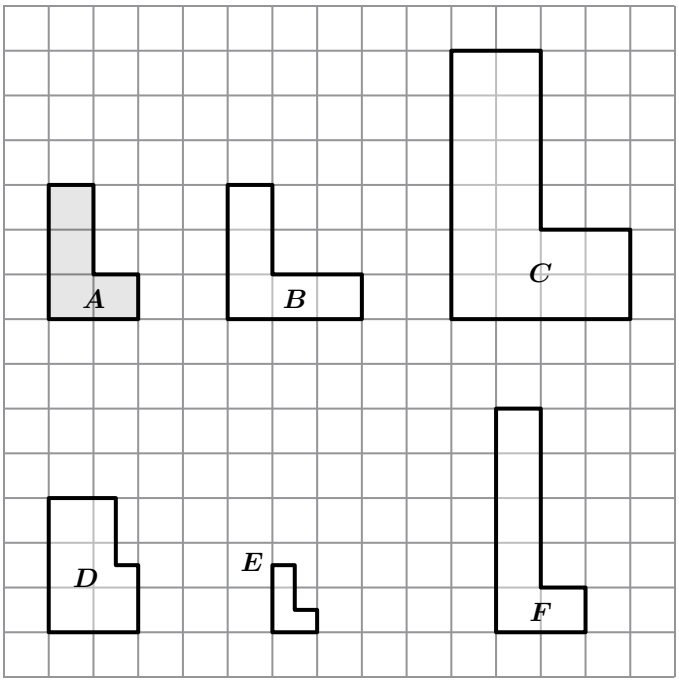
Name: Date: Period:

Show What You Know

2.01

Circle a shape that is not a scaled copy of figure A.

Explain how you know that the shape you circled is *not* a scaled copy of figure A.



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Name: Date: Period:

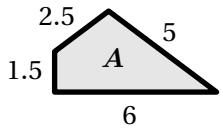
Show What You Know

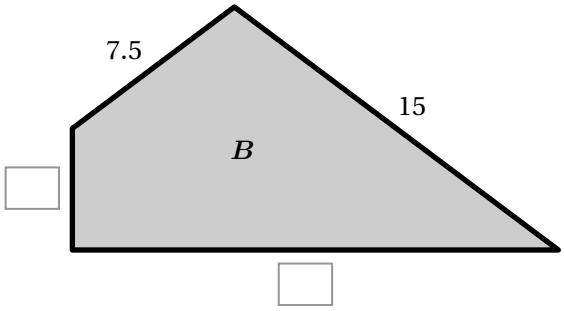
2.02

Figure B is a scaled copy of figure A.

Determine and label the missing side lengths of figure B.

Explain your thinking.





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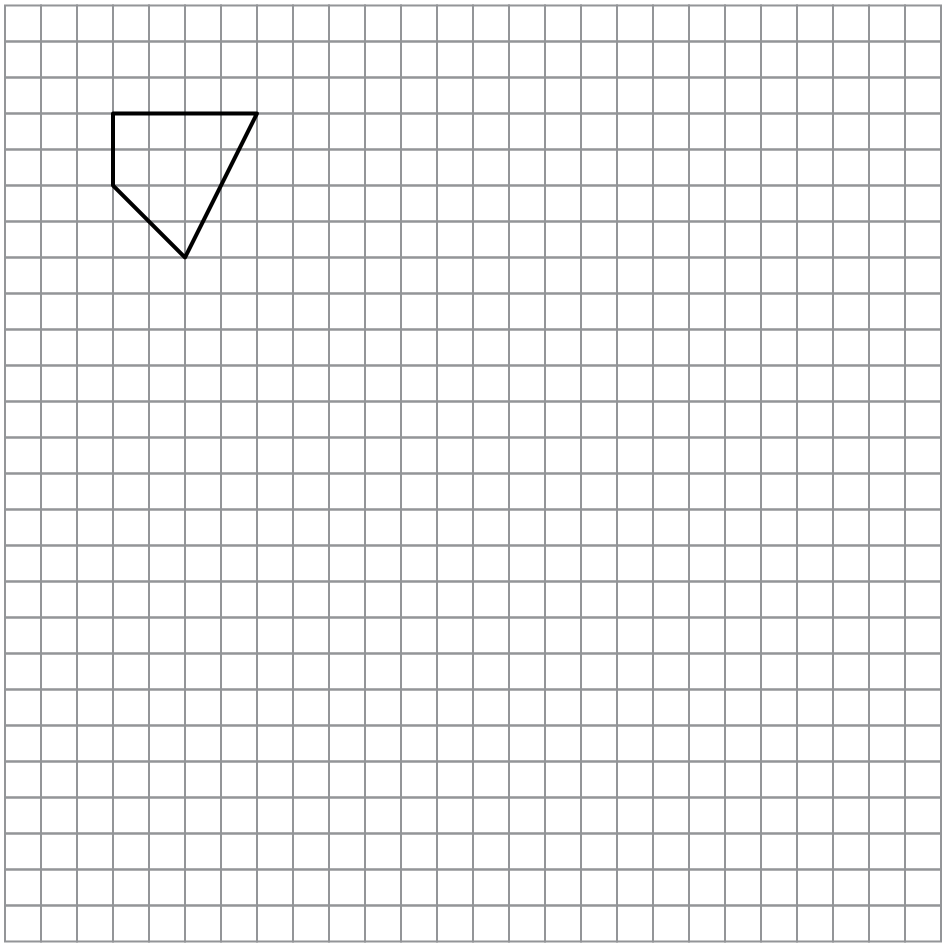
Name: Date: Period:

Show What You Know

2.03

Draw a scaled copy of the polygon using a scale factor of 3.



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Name: Date: Period:

Show What You Know

2.04

What scale factor makes figure A match figure B?

What scale factor makes figure B match figure A?

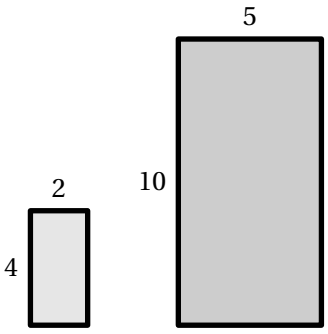

Figure A Figure B

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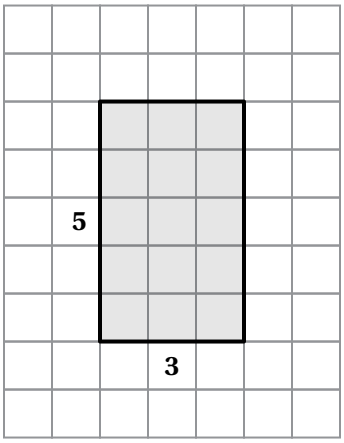
Name: Date: Period:

Show What You Know

2.05

Imagine scaling this rectangle using a scale factor of 4.

What is the area of the scaled copy?



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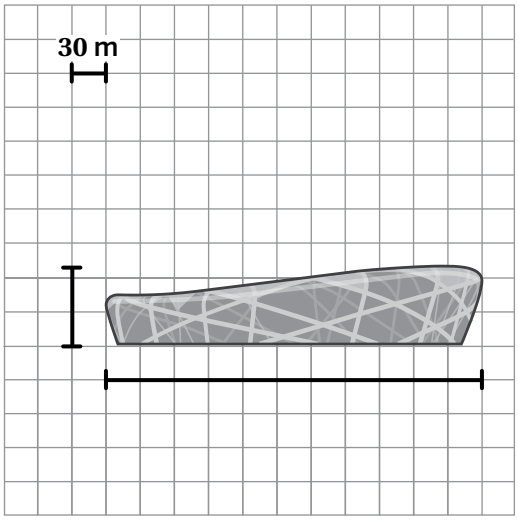
Name: Date: Period:

Show What You Know

2.06

Here is a scale drawing of the National Stadium, also known as the Bird's Nest, located in Beijing, China.



Estimate the actual width and height of the National Stadium and write your estimates in the table.

Estimated Width (m)	Estimated Height (m)

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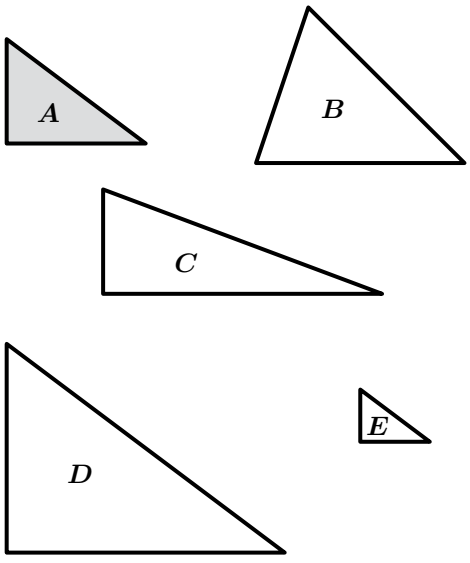
Name: Date: Period:

Show What You Know

2.07

Circle *all* the figures that could be a dilation of figure A. Explain your thinking.



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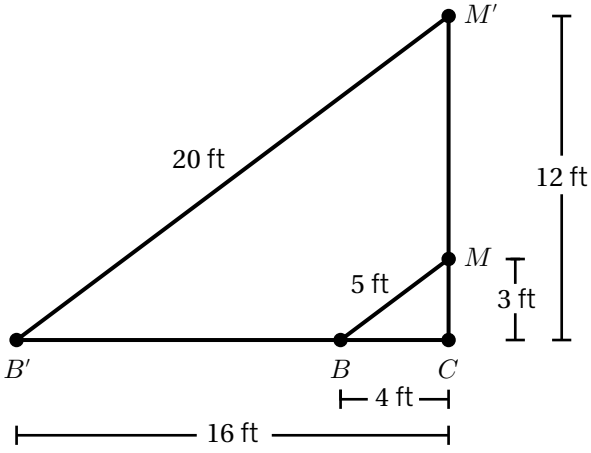
Name: Date: Period:

Show What You Know

2.08

Segment BM is dilated using point C as the center of dilation.

What is the scale factor? Explain your thinking.



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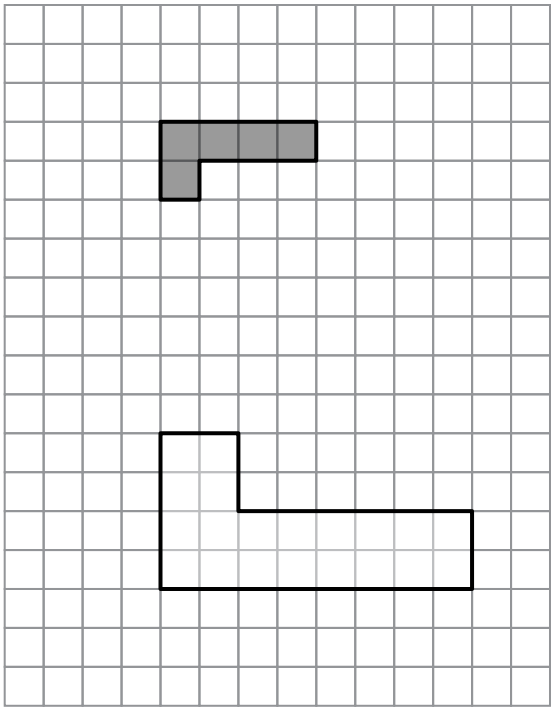
Name: Date: Period:

Show What You Know

2.09

Describe a sequence of transformations that moves the pre-image (shaded) onto the image.



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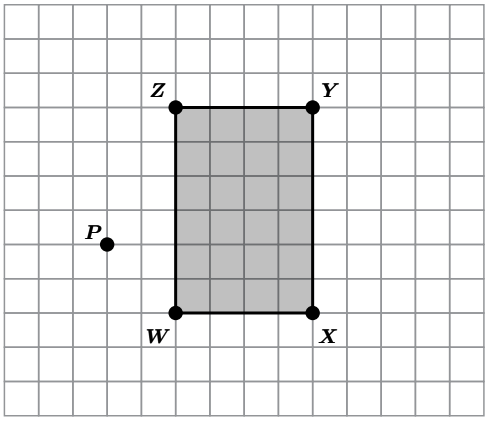
Name: Date: Period:

Show What You Know

2.10

Dilate rectangle $WXYZ$ using a scale factor of $\frac{1}{2}$ and point P as the center of dilation.



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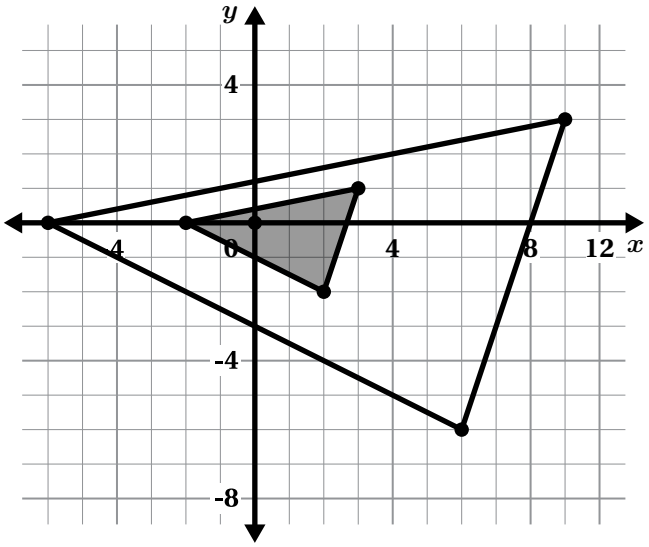
Name: Date: Period:

Show What You Know

2.11

The smaller triangle was dilated to create the larger triangle. The center of dilation is plotted but not labeled.

Describe this dilation. Be sure to include all of the information someone would need to perform the dilation.



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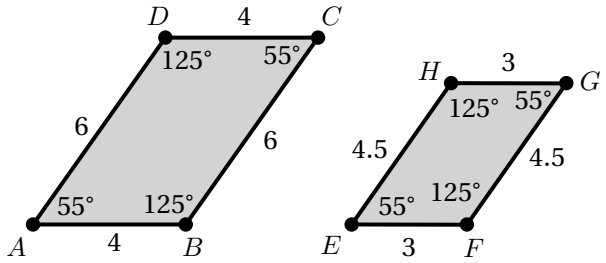
Name: Date: Period:

Show What You Know

2.12

Is quadrilateral $ABCD$ similar to quadrilateral $EFGH$?

Explain your thinking.



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Name: Date: Period:

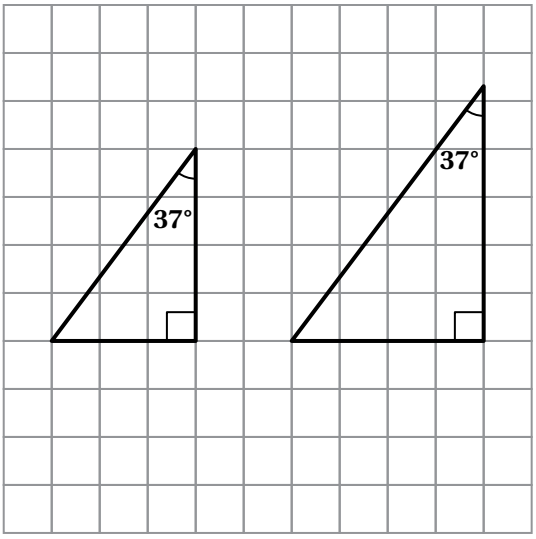
Show What You Know

2.13

Are these triangles similar? Circle one.

Yes No

Explain your thinking.



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Name: _____ Date: _____ Period: _____

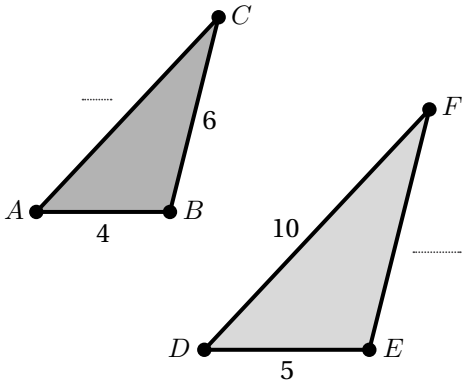
Show What You Know

2.14

Triangles ABC and DEF are similar.

a Determine the missing values.

b Explain your thinking.



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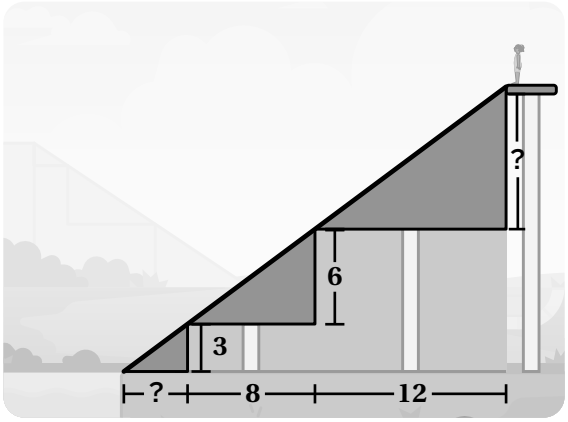
Name: Date: Period:

Show What You Know

2.15

Here is a smooth slide. Fill in the missing values so the triangles have the same slope.

Ramp	Base (ft)	Height (ft)
Ramp 1		3
Ramp 2	8	6
Ramp 3	12	



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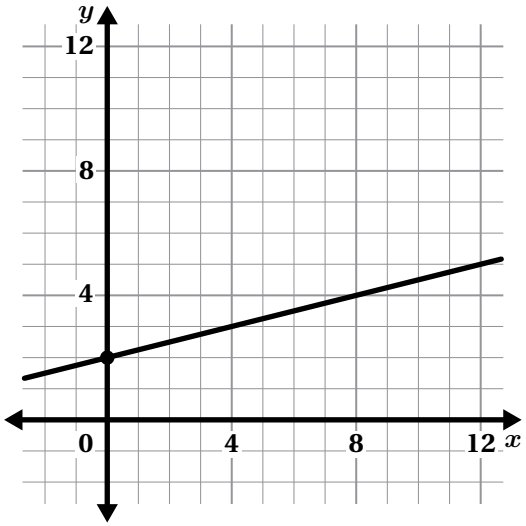
Name: Date: Period:

Show What You Know

2.16

Determine the slope of this line.



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Show What You Know **Lesson 1**

Name: _____ Date: _____ Period: _____

Show What You Know 2.01

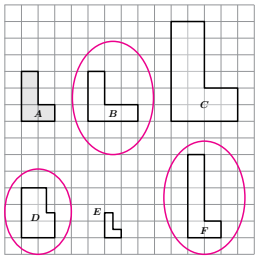
Circle a shape that is not a scaled copy of figure A.

Possible responses shown.

Explain how you know that the shape you circled is *not* a scaled copy of figure A.

Explanations vary.

- **Figure B is not a scaled copy of figure A because the side lengths are not proportional. The figures are the same height, but not the same width.**
- **Figure D is not a scaled copy of figure A because they're not the same shape. The two figures are the same height and width, but the area of figure D is greater.**
- **Figure F is not a scaled copy of figure A because the side lengths don't make equivalent ratios. The height ratio is $\frac{3}{3}$ and the width ratio is $\frac{2}{2}$.**



Accelerated 7 83

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Show What You Know **Lesson 2**

Name: _____ Date: _____ Period: _____

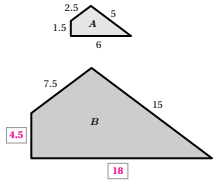
Show What You Know 2.02

Figure B is a scaled copy of figure A.

Determine and label the missing side lengths of figure B.

Explain your thinking.

***Explanations vary.* To find the missing lengths, I multiplied each length in figure A by 3 because the scale factor from A to B is 3.**



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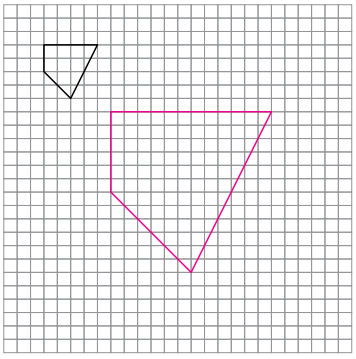
Show What You Know **Lesson 3**

Name: _____ Date: _____ Period: _____

Show What You Know 2.03

Draw a scaled copy of the polygon using a scale factor of 3.



Accelerated 7 85

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Show What You Know **Lesson 4**

Name: _____ Date: _____ Period: _____

Show What You Know 2.04

What scale factor makes figure A match figure B?

$\frac{5}{2}$

What scale factor makes figure B match figure A?

$\frac{2}{5}$

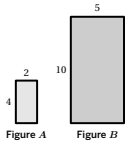

Figure A Figure B

Accelerated 7 86

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Show What You Know **Lesson 5**

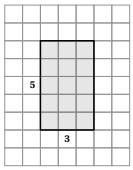
Name: _____ Date: _____ Period: _____

Show What You Know 2.05

Imagine scaling this rectangle using a scale factor of 4.

What is the area of the scaled copy?

240 square units



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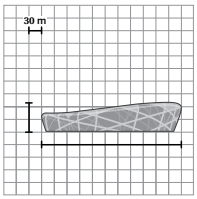
Show What You Know **Lesson 6**

Name: _____ Date: _____ Period: _____

Show What You Know 2.06

Here is a scale drawing of the National Stadium, also known as the Bird's Nest, located in Beijing, China.

Estimate the actual width and height of the National Stadium and write your estimates in the table.



Estimated Width (m)	Estimated Height (m)
Responses between 330 and 340 meters are considered correct.	**Responses between 60 and 80 meters are considered correct.**

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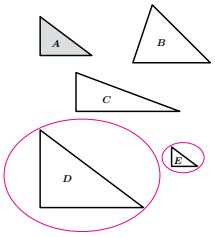
Show What You Know **Lesson 7**

Name: _____ Date: _____ Period: _____

Show What You Know 2.07

Circle *all* the figures that could be a dilation of figure A. Explain your thinking.

***Explanations vary.* Both figures D and E look like scaled copies of figure A, so both could be the result of a dilation of figure A.**



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Show What You Know **Lesson 8**

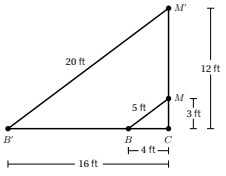
Name: _____ Date: _____ Period: _____

Show What You Know 2.08

Segment BM is dilated using point C as the center of dilation.

What is the scale factor? Explain your thinking.

4. *Explanations vary.*
- **The scale factor is 4 because the distance between points C and M' is 4 times the distance between points C and M.**
- **The scale factor is 4 because segment BM is 5 feet and segment $B'M'$ is 20 feet, and $5 \cdot 4 = 20$.**



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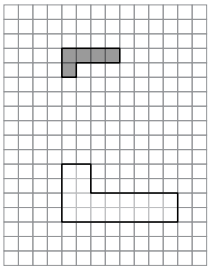
Show What You Know **Lesson 9**

Name: _____ Date: _____ Period: _____

Show What You Know 2.09

Describe a sequence of transformations that moves the pre-image (shaded) onto the image.

Responses vary. Reflect over a horizontal line exactly between the pre-image and image. Then dilate using a scale factor of 2 and the top left corner of the pre-image as the center of dilation.



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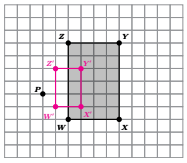
Show What You Know **Lesson 10**

Name: _____ Date: _____ Period: _____

Show What You Know 2.10

Dilate rectangle $WXYZ$ using a scale factor of $\frac{1}{2}$ and point P as the center of dilation.



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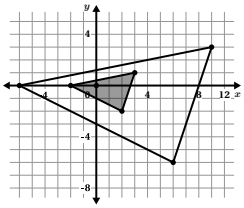
Show What You Know **Lesson 11**

Name: _____ Date: _____ Period: _____

Show What You Know 2.11

The smaller triangle was dilated to create the larger triangle. The center of dilation is plotted but not labeled.

Describe this dilation. Be sure to include all of the information someone would need to perform the dilation.



Responses vary. Responses should include:

- The center of dilation is (0, 0) because the distance between the pre-image points and (0, 0) grows with the same scale factor for all points in the original figure.
- The triangle being dilated has vertices at (-2, 0), (3, 1), and (2, -2).
- The scale factor is 3 because the distance between each vertex and the center of dilation grows by a factor of 3. For example, the vertex (-2, 0) is 2 units away from the center of dilation. The corresponding vertex in the image is (-6, 0), which is 6 units away from the same point. This distance is multiplied by a factor of 3.

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Show What You Know **Lesson 12**

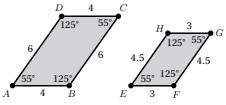
Name: _____ Date: _____ Period: _____

Show What You Know 2.12

Is quadrilateral $ABCD$ similar to quadrilateral $EFGH$?

Yes quadrilateral $ABCD$ is similar to quadrilateral $EFGH$.

Explain your thinking.



Explanations vary.

- The corresponding angles are congruent, and there is a common scale factor of $\frac{3}{4}$ between the corresponding sides.

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Show What You Know **Lesson 13**

Name: _____ Date: _____ Period: _____

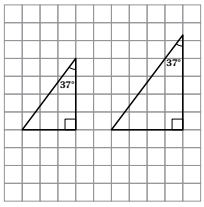
Show What You Know 2.13

Are these triangles similar? Circle one.

(Yes) No

Explain your thinking.

Explanations vary. These triangles are similar because two pairs of corresponding angles are congruent.



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Show What You Know **Lesson 14**

Name: _____ Date: _____ Period: _____

Show What You Know 2.14

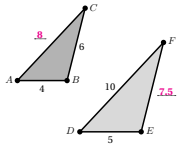
Triangles ABC and DEF are similar.

a. Determine the missing values.

Responses shown on diagram.

b. Explain your thinking.

Responses vary. I saw that the ratio of the corresponding side AB to DE was 4:5, or 1:1.25. So, I multiplied the length of BC by the scale factor. $6 \times 1.25 = 7.5$, so side BC is 7.5 units long. Then, I divided the length of DF by the scale factor. $10 \div 1.25 = 8$, so side AC is 8 units long.



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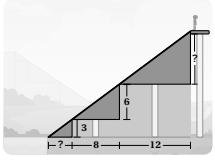
Show What You Know **Lesson 15**

Name: _____ Date: _____ Period: _____

Show What You Know 2.15

Here is a smooth slide. Fill in the missing values so the triangles have the same slope.

Ramp	Base (ft)	Height (ft)
Ramp 1	4	3
Ramp 2	8	6
Ramp 3	12	9



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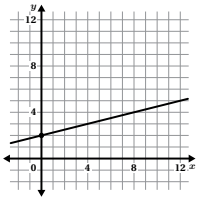
Show What You Know **Lesson 16**

Name: _____ Date: _____ Period: _____

Show What You Know 2.16

Determine the slope of this line.

$\frac{1}{4}$ (or equivalent)



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Unit 3
Assessments and Rubrics

Name: ..... Date: ..... Period: .....

Pre-Unit Check

Unit 3

1. A length of 4 yards is equal to 12 feet. How many feet is 10 yards equal to?

2. The ratio of the number of hippos to the number of crocodiles at a watering hole is $4 : 3$.

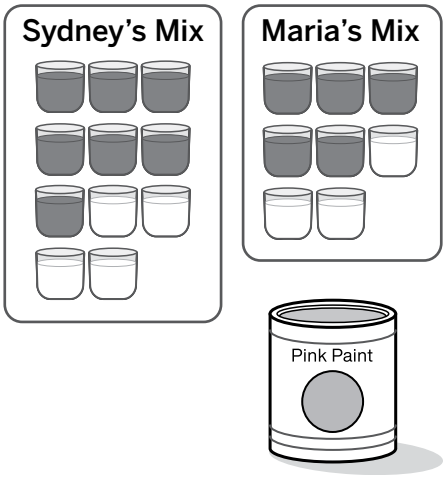
How many crocodiles would there be if there were 24 hippos?

3. If you mix red and white paint in different ratios, you will get different colors of pink paint. If the ratios are equivalent, the colors of pink will be the same.

Sydney and Maria each mix their own batch of pink paint.

Are their batches the same color of pink?

Explain your thinking.



4. Antwon makes hot chocolate by mixing 2 cups of milk with 5 tablespoons of cocoa.

a How many tablespoons of cocoa would he need for 1 cup of milk?

b How many cups of milk would he need for 1 tablespoon of cocoa?

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Pre-Unit Check (continued)

Unit 3

5. An airplane flew across the Pacific Ocean at a constant speed. The table shows the amount of time and the distance traveled. Complete the table.

Time (hr)	Distance Traveled (mi)
2	
3	1,650
6	

6. Blueberries cost $4.00 per pound.

a How many pounds of blueberries can you buy for $1.00?

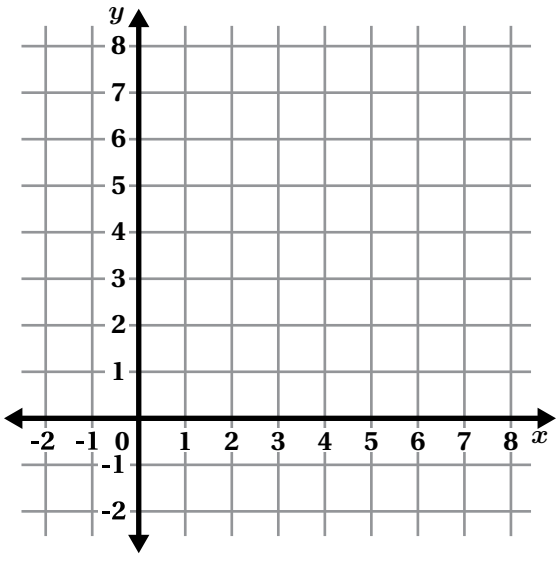
b How many pounds of blueberries can you buy for $13.00?

Explain or show your thinking.

7. The table shows some coordinate pairs.

x	y
4	3
2	6
5	0

Plot these points in the coordinate plane.



Name: ..... Date: ..... Period: .....

Sub-Unit Quiz

Unit 3

1. Which table represents a proportional relationship?

A.

x	y
2	3
4	5
10	11

B.

x	y
2	4
4	5
10	6

C.

x	y
2	4
4	16
10	100

D.

x	y
2	3
4	6
10	15

2. Select *all* of the proportional relationships.

- ☐ **A.** $y = 2.5x$
- ☐ **B.** A turtle walks for 5 minutes, then stops for a minute.
- ☐ **C.** A turtle starts at the starting line and walks at a constant rate.
- ☐ **D.** $y = \frac{2.5}{x}$
- ☐ **E.** $y = \frac{5}{2}x$

3. Jordan is mixing water and flour to make tortillas. The equation $w = 0.75f$ represents the number of cups of water, w, needed for f cups of flour.

a What does 0.75 mean in this situation?

b How many cups of water does Jordan need for 4 cups of flour?

c How many cups of flour does Jordan need for 1 cup of water?

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Sub-Unit Quiz (continued)

4. When you mix two colors of paint in equivalent ratios, the result is always the same color.

a Complete the table so that there is a proportional relationship between cups of blue paint and cups of red paint.

Blue Paint (cups), b	Red Paint (cups), r
1	
2	3
	7
10	

b What is a constant of proportionality for this relationship?

What does it represent in this situation?

c Write an equation for the relationship between the number of cups of blue paint, b, and the number of cups of red paint, r.

5. Titus took 30 minutes to walk 2 miles at a constant rate.

- d is the distance Titus walks, in miles.
- t is the time it takes Titus to walk, in minutes.

a Write *two* different constants of proportionality for this relationship.

b Write *two* different equations to represent the relationship between d and t.

c If Titus walked 7.5 miles at this same rate, how many minutes would it take? Explain or show your thinking.

Standard	MA.7.AR.4.1	MA.7.AR.4.2	MA.7.AR.4.4	MA.7.AR.4.5	MA.8.AR.3.1
Problem(s)	1, 2	4b, 5a	2, 4c, 5b	3a, 3b, 3c, 5c	3a, 4a

Problem 1

Standards: MA.7.AR.4.1, MTR.5.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: x | y 2 | 3 4 | 6 10 | 15			**Incorrect** choice. Students who select the table with ordered pair $(10, 100)$ may have noticed that the value of y is the value of x multiplied by itself.

Problem 2

Standards: MA.7.AR.4.1, MA.7.AR.4.4

4 Meeting	3 Approaching	2 Developing	1 Beginning
All correct choices and **no incorrect** choices. • $y = 2.5x$ • A turtle starts at the starting line and walks at a constant rate. • $y = \frac{5}{2}x$	**One or two correct** choices and **no incorrect** choices. **All correct** choices and **one incorrect** choice. Students who select the turtle that stops for a minute may need more support representing the situation as a table or graph to see that it is not proportional.	**One or two correct** choices and **one incorrect** choice.	**Only incorrect** choices. **Two or more incorrect** choices with some correct choices.

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Problem 3a

Standards: MA.7.AR.4.5, MA.8.AR.3.1, MTR.6.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: *Responses vary.* 0.75 means that 0.75 cups of water must be mixed with each cup of flour.	Response shows **conceptual understanding** with minor errors. Students who write "0.75 cups of flour must be mixed with each cup of water" may have reversed the variables in the context.	Response shows **incomplete understanding** with significant errors. E.g., Response does not reference both cups of flour and cups of water.	Response shows **limited understanding**.

Problem 3b

Standard: MA.7.AR.4.5

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: 3 cups of water (or equivalent)	Response shows **conceptual understanding** with minor errors. Students who write "5.33 cups" may have determined the number of cups of flour instead of cups of water.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding**.

Problem 3c

Standard: MA.7.AR.4.5

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $\frac{4}{3}$ cups of flour (or equivalent)	Response shows **conceptual understanding** with minor errors. Students who write "0.75 cups" may have determined the number of cups of water instead of cups of flour.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding**.

Problem 4a

Standard: MA.8.AR.3.1

4 Meeting

Correct response:

All correct answers (or equivalent)

Blue Paint (cups), b	Red Paint (cups), r
1	$\frac{3}{2}$
2	3
$\frac{14}{3}$	7
10	15

3 Approaching

Response shows **conceptual understanding** with minor errors.

Students who write $\frac{2}{3}$, $\frac{21}{2}$, and $\frac{20}{3}$ may have calculated the other constant of proportionality.

2 Developing

Response shows **incomplete understanding** with significant errors.

1 Beginning

Response shows **limited understanding**.

Problem 4b

Standard: MA.7.AR.4.2

4 Meeting

Correct response and **complete** explanation.

$\frac{3}{2}$ (or equivalent) or $\frac{2}{3}$ (or equivalent)

Explanations vary.

- **The constant of proportionality $\frac{3}{2}$ represents the number of cups of red paint needed for each cup of blue paint.**
- **The constant of proportionality $\frac{2}{3}$ represents the number of cups of blue paint needed for each cup of red paint.**

3 Approaching

Correct response with **minor flaws** in explanation.

E.g., Response includes the correct constant of proportionality but has an inaccurate explanation.

Incorrect response with logical and **complete explanation**.

E.g., Response incorrectly names the constant of proportionality but has an accurate explanation.

2 Developing

Correct response with **incomplete** explanation.

Incorrect response with explanation that shows **partial understanding**.

E.g., Response includes both inaccurate constants and explanations but references a relationship between cups of blue paint and red paint.

1 Beginning

Incorrect response with **no** explanation.

Problem 4c

Standards: MA.7.AR.4.4, MTR.7.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $r = \frac{3}{2}b$ (or equivalent) or $b = \frac{2}{3}r$ (or equivalent)	Response shows **conceptual understanding** with minor errors. E.g., Response includes a correctly structured equation based on an incorrect constant of proportionality from part 4b. Students who write $r = \frac{2}{3}b$ or $b = \frac{3}{2}r$ may have reversed the variables in the context.	Response shows **incomplete understanding** with significant errors. Students who write $r = b + 1$ may have noticed that 2 cups of blue paint and 3 cups of red paint make this equation true.	Response shows **limited understanding**.

Problem 5a

Standard: MA.7.AR.4.2

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: 15 (or equivalent), $\frac{1}{15}$ (or equivalent)	Response shows **conceptual understanding** with minor errors. E.g., Responses are reciprocals of each other.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding**. Students who write 30 and 2 may have used the values from the description.

Problem 5b

Standards: MA.7.AR.4.4, MTR.7.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $t = 15d$ (or equivalent), $d = \frac{1}{15}t$ (or equivalent)	Response shows **conceptual understanding** with minor errors. E.g., Response includes correctly structured equations based on incorrect constants of proportionality from part 5a. Students who write $d = 15t$ and $t = \frac{1}{15}d$ may have reversed the variables in the context.	Response shows **incomplete understanding** with significant errors. Students who write an equation in the form $d = kt$ or $t = kd$ may understand what makes an equation proportional.	Response shows **limited understanding**.

Problem 5c			Standard: MA.7.AR.4.5
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response and **complete** explanation. **112.5 minutes.** ***Explanations vary.*** **I multiplied 7.5 miles by the constant of proportionality, 15, to get $7.5 \times 15 = 112.5$ minutes.**	**Correct** response with **minor flaws** in explanation. **Incorrect** response with logical and **complete explanation**. E.g., Response that incorrectly calculates the minutes (due to a calculator error) but has an accurate explanation. E.g., Response that uses the previous incorrect equation correctly in this situation.	**Correct** response with **incomplete** explanation. **Incorrect** response with explanation that shows **partial understanding**. Students who write 0.5 may have used the wrong equation or substituted 7.5 in place of t.	**Incorrect** response with **no** explanation.

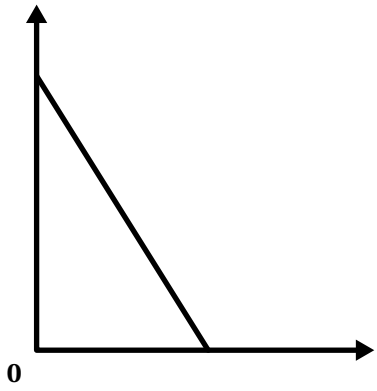
Name: ..... Date: ..... Period: .....

End-of-Unit Assessment

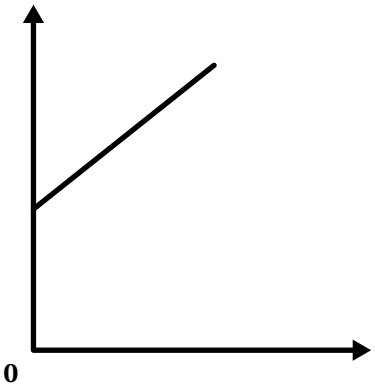
Unit 3

1. Which graph represents a proportional relationship?

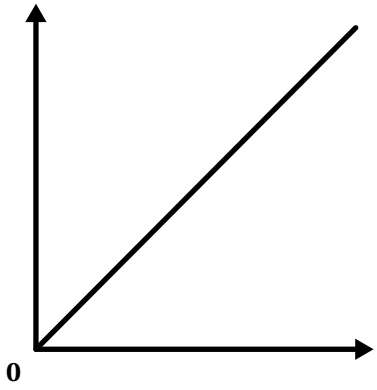
A.



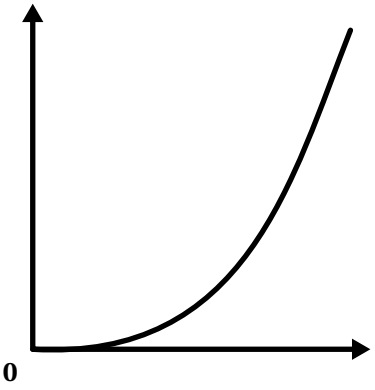
B.



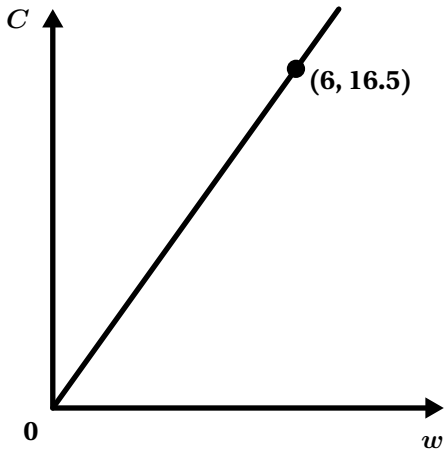
C.



D.



2. This graph shows the cost in dollars, C, of w pounds of blueberries.



The relationship between C and w is proportional.

Select *all* of the true statements.

- ☐ **A.** 2.75 pounds of blueberries cost \$1.
- ☐ **B.** A constant of proportionality is \$2.75.
- ☐ **C.** 5 pounds of blueberries cost \$15.50.
- ☐ **D.** 12 pounds of blueberries cost \$33.
- ☐ **E.** The point $(3, 9)$ is on the graphed line.

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End-of-Unit Assessment (continued)

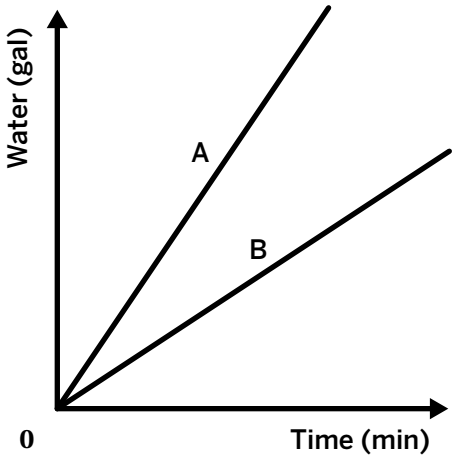
Unit 3

3. Kadeem rode his bike at a constant speed. He rode 1 mile in 5 minutes.

Which equation represents the amount of time in minutes, t, that it took for him to ride a distance of d miles?

(A.) $t = 5d$ (B.) $t = \frac{1}{5}d$ (C.) $t = d + 4$ (D.) $t = d - 4$

4. These two lines represent the amount of water filling two tanks of the same size over time.



Which tank is filling more quickly? Circle one.

Tank A Tank B Not enough information

Explain or show your thinking.

5. This table shows the weight of 100 raspberries at a market.

Complete the table so there is a proportional relationship between the number of raspberries and their weight.

Number of Raspberries	Weight (kg)
40	
100	0.40
300	

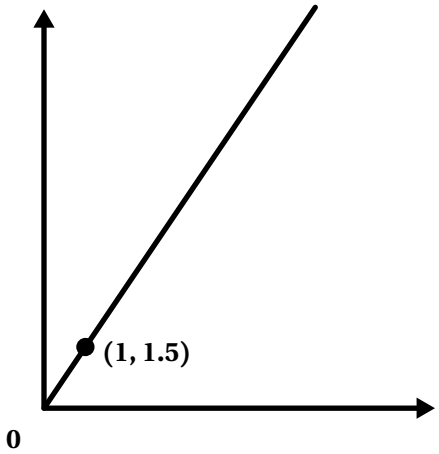
6. The equation $F = \frac{9}{5}C + 32$ represents the relationship between temperature in degrees Celsius, C, and temperature in degrees Fahrenheit, F.

Is there a proportional relationship between C and F?

Explain or show your thinking.

7. A cookie recipe uses 3 tablespoons of cookie batter for every 2 tablespoons of chocolate chips.

This line represents the relationship between tablespoons of cookie batter and tablespoons of chocolate chips in the recipe. The point $(1, 1.5)$ is on the line.



a Label the axes to represent the situation.

b Write an equation for the line.

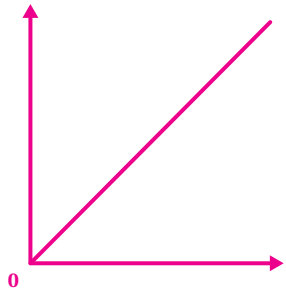
Use b for the number of tablespoons of cookie batter and c for the number of tablespoons of chocolate chips.

c Explain what the point $(1, 1.5)$ means in this situation.

Standard	MA.7.AR.4.1	MA.7.AR.4.2	MA.7.AR.4.4	MA.7.AR.4.5	MA.8.AR.3.1
Problem(s)	1	2	3, 7b	4, 7c	5, 6, 7a

Problem 1

Standard: MA.7.AR.4.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice:  			**Incorrect** choice. Students who select either of the linear graphs that are not proportional may know that the graph of a proportional relationship is linear, but not that the line must contain $(0, 0)$. Students who select the curved graph may know that the graph contains $(0, 0)$, but not that the graph must be linear.

Problem 2

Standards: MA.7.AR.4.2, MTR.6.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Both correct choices and **no incorrect** choices. • A constant of proportionality is \$2.75. • 12 pounds of blueberries cost \$33.	**One correct** choice and **no incorrect** choices. **Both correct** choices and **one incorrect** choice.	**One correct** choice and **one incorrect** choice.	**Only incorrect** choices. **Two or more incorrect** choices with some correct choices.

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Problem 3

Standards: MA.7.AR.4.4, MTR.7.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: $t = 5d$			**Incorrect** choice. Students who select $t = \frac{1}{5}d$ may have reversed the variables in the context or may think that these equations always contain a fraction. Students who select $t = d + 4$ may have noticed that 1 mile in 5 minutes makes this equation true.

Problem 4

Standards: MA.7.AR.4.5, MTR.4.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. Tank A. *Explanations vary.* I know Tank A is filling more quickly because it's represented by the steeper graph. I can also choose a time and see how much water is in the two tanks at that moment.	**Correct** response with **minor flaws** in explanation. E.g., Response identifies Tank A but includes incorrect or imprecise description of the rates. **Incorrect** response with logical and **complete explanation**. Students who select *Tank B* may have answered the question "Which tank is filling more slowly?"	**Correct** response with **incomplete** explanation. **Incorrect** response with explanation that shows **partial understanding**. E.g., Response includes an incorrect answer with an explanation showing partial understanding of proportional relationships represented with a graph.	**Incorrect** response with **no** explanation.

Problem 5

Standard: MA.8.AR.3.1

4 Meeting

Correct response:

Number of Raspberries	Weight (kg)
40	0.16 (or equivalent)
100	0.40
300	1.2 (or equivalent)

3 Approaching

Response shows **conceptual understanding** with minor errors.

E.g., Response includes the correct weight for either 40 or 300 raspberries but not both.

2 Developing

Response shows **incomplete understanding** with significant errors.

Students who write that 300 raspberries weigh 0.12 kilograms may have multiplied 0.4 and 3 incorrectly.

1 Beginning

Response shows **limited understanding**.

E.g., Response includes incorrect weights for both 40 and 300 raspberries.

Students who write that 300 raspberries weigh 2.40 kilograms may have used addition instead of multiplication.

Problem 6

Standards: MA.8.AR.3.1, MTR.3.1

4 Meeting

Correct response and **complete** explanation.

No. *Explanations vary.* The equation $F = \frac{9}{5}C + 32$ is not in the form $y =$ (something)x.

3 Approaching

Correct response with **minor flaws** in explanation.

Incorrect response with logical and **complete explanation**.

Students who write that the equation is proportional may have noticed the fraction $\frac{9}{5}$ multiplied by a variable and assumed that this is enough to prove the relationship is proportional.

2 Developing

Correct response with **incomplete** explanation.

Incorrect response with explanation that shows **partial understanding**.

1 Beginning

Incorrect response with **no** explanation.

Problem 7a

Standard: MA.8.AR.3.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: The vertical axis should be labeled "Cookie Batter (tbsp)" and the horizontal axis should be labeled "Chocolate Chips (tbsp)."		Response shows **incomplete understanding** with significant errors. Students who label the horizontal axis "tablespoons of cookie batter" may have misinterpreted the meaning of the situation or were not sure how to connect the situation with the point $(1, 1.5)$ on the graph.	Response shows **limited understanding**. Students who label the axes as quantities other than "tablespoons of chocolate chips" and "tablespoons of cookie batter" may have misunderstood the variables in the situation.

Problem 7b

Standard: MA.7.AR.4.4

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $b = 1.5c$ (or equivalent)	Response shows **conceptual understanding** with minor errors. Students who write $c = 1.5b$ or $b = \frac{2}{3}c$ may have reversed the variables in the context.	Response shows **incomplete understanding** with significant errors. Students who write $b = 1.5$ or $c = \frac{2}{3}$ may have calculated a unit rate instead of writing an equation for the relationship.	Response shows **limited understanding**. Students who write $b = c + 0.5$ may have noticed that 1 tablespoon of chocolate chips and 1.5 tablespoons of cookie batter makes this equation true.

Problem 7c

Standards: MA.7.AR.4.5, MTR.6.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: *Explanations vary.* The point $(1, 1.5)$ tells me that the recipe uses 1 tablespoon of chocolate chips for every 1.5 tablespoons of cookie batter. This point gives a unit rate.	Response shows **conceptual understanding** with minor errors. E.g., Response accurately describes the meaning of the point in context but lacks details such as units in the explanation.	Response shows **incomplete understanding** with significant errors. E.g., Response mentions the point in relation to cookie batter and chocolate chips, but is not clear.	Response shows **limited understanding**.

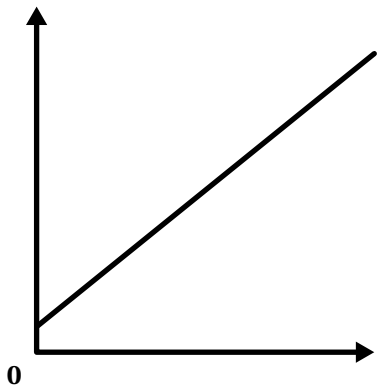
Name: ..... Date: ..... Period: .....

End-of-Unit Assessment

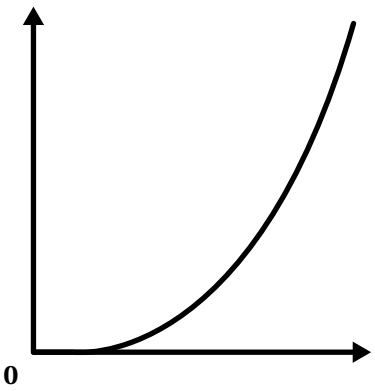
Unit 3

1. Which graph represents a proportional relationship?

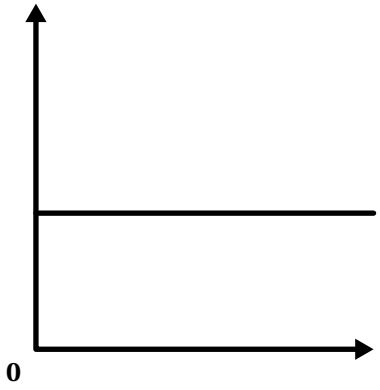
A.



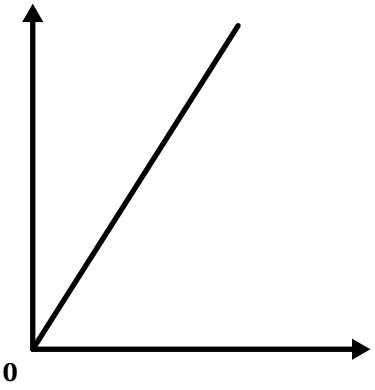
B.



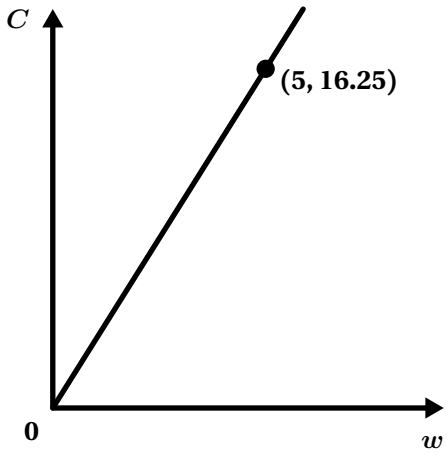
C.



D.



2. This graph shows the cost in dollars, C, of w pounds of strawberries.



The relationship between C and w is proportional.

Select *all* of the true statements.

- ☐ **A.** 3.25 pounds of strawberries cost \$1.
- ☐ **B.** A constant of proportionality is \$3.25.
- ☐ **C.** 4 pounds of strawberries cost \$13.
- ☐ **D.** 10 pounds of strawberries cost \$32.
- ☐ **E.** The point $(3, 10)$ is on the graphed line.

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End-of-Unit Assessment (continued)

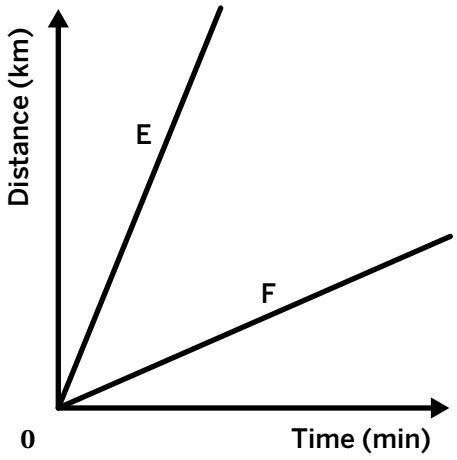
Unit 3

3. Abdullah walked to school at a constant speed. He walked 1 mile in 15 minutes.

Which equation represents the amount of time in minutes, t, that it took for him to walk a distance of d miles?

A. $t = d + 14$ **B.** $t = d - 14$ **C.** $t = 15d$ **D.** $t = \frac{1}{15}d$

4. These two lines represent the distance that two runners ran in a race.



Which runner ran more slowly? Circle one.

Runner E Runner F Not enough information

Explain or show your thinking.

5. This table shows the weight of 100 raspberries at a market.

Complete the table so there is a proportional relationship between the number of blueberries and their weight.

Number of Blueberries	Weight (kg)
60	
100	0.60
400	

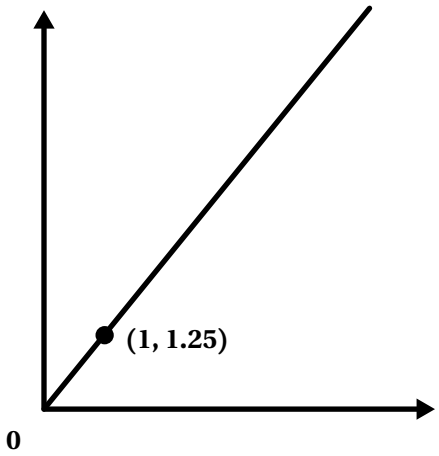
6. The equation $p = 2.2x$ represents the relationship between mass in pounds, p, and mass in kilograms, x.

Is there a proportional relationship between p and x?

Explain or show your thinking.

7. A recipe for tortillas uses 5 cups of flour for every 4 cups of water.

This line represents the relationship between the amount of flour and the amount of water needed for this recipe. The point $(1, 1.25)$ is on the line.



a Label the axes to represent the situation.

b Write an equation for the line.

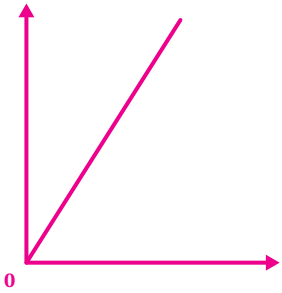
Use f for the number of cups of flour and w for the number of cups of water.

c Explain what the point $(1, 1.25)$ means in this situation.

Standard	MA.7.AR.4.1	MA.7.AR.4.2	MA.7.AR.4.4	MA.7.AR.4.5	MA.8.AR.3.1
Problem(s)	1	2	3, 7b	4, 7c	5, 6, 7a

Problem 1

Standard: MA.7.AR.4.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice:  			**Incorrect** choice. Students who select either of the not proportional linear graphs that the graph of a proportional relationship is linear, but not that the line must contain $(0, 0)$. Students who select the curved graph may know that the graph contains $(0, 0)$, but not that the graph must be linear.

Problem 2

Standards: MA.7.AR.4.2, MTR.6.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Both correct choices and **no incorrect** choices. • **A constant of proportionality is \$3.25.** • **4 pounds of strawberries cost \$13.**	**One correct** choice and **no incorrect** choices. **Both correct** choices and **one incorrect** choice.	**One correct** choice and **one incorrect** choice.	**Only incorrect** choices. **Two or more incorrect** choices with some correct choices.

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Problem 3

Standards: MA.7.AR.4.4, MTR.7.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: $t = 15d$			**Incorrect** choice. Students who select $t = \frac{1}{15}d$ may have reversed the variables in the context or may think that these equations always contain a fraction. Students who select $t = d + 14$ may have noticed that 1 mile in 15 minutes makes this equation true.

Problem 4

Standards: MA.7.AR.4.5, MTR.4.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. **Runner F. *Explanations vary.* I know that Runner F ran slower because Runner F's graph is less steep. Another way to figure out which person ran slower is to choose a time and see which runner traveled the shorter distance in that time.**	**Correct** response with **minor flaws** in explanation. E.g., Response identifies Runner F but includes incorrect or imprecise description of the rates. **Incorrect** response with logical and **complete explanation**. Students who select *Runner E* may have answered the question "Which runner is running more quickly?"	**Correct** response with **incomplete** explanation. **Incorrect** response with explanation that shows **partial understanding**. E.g., Response includes an incorrect answer with an explanation showing partial understanding of proportional relationships represented with a graph.	**Incorrect** response with **no** explanation.

Problem 5

Standard: MA.8.AR.3.1

4 Meeting

Correct response:

Number of Blueberries	Weight (kg)
60	0.36 (or equivalent)
100	0.60
400	2.4 (or equivalent)

3 Approaching

Response shows **conceptual understanding** with minor errors.

E.g., Response includes the correct weight for either 60 or 400 blueberries but not both.

2 Developing

Response shows **incomplete understanding** with significant errors.

Students who write that 400 blueberries weigh 0.24 kilograms may have multiplied 0.6 and 4 incorrectly.

1 Beginning

Response shows **limited understanding**.

E.g., Response includes incorrect weights for both 60 and 400 blueberries.

Students who write that 400 blueberries weigh 3.60 kilograms may have used addition instead of multiplication.

Problem 6

Standards: MA.8.AR.3.1, MTR.3.1

4 Meeting

Correct response and **complete** explanation.

Yes. *Explanations vary.* One way to decide if a relationship is proportional is to look at the equation and see if it has the form $y =$ (something)x. The "something" is the constant of proportionality. In this case, 2.22 is the constant of proportionality.

3 Approaching

Correct response with **minor flaws** in explanation.

Incorrect response with logical and **complete explanation**.

2 Developing

Correct response with **incomplete** explanation.

E.g., Response mentions multiplication without making a connection to constants of proportionality.

Incorrect response with explanation that shows **partial understanding**.

1 Beginning

Incorrect response with **no** explanation.

Problem 7a

Standard: MA.8.AR.3.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: The vertical axis should be labeled "Flour (cups)" and the horizontal axis should be labeled "Water (cups)."		Response shows **incomplete understanding** with significant errors. Students who label the horizontal axis "cups of flour" may have misinterpreted the meaning of the situation or were not sure how to connect the situation with the point $(1, 1.25)$ on the graph.	Response shows **limited understanding**. Students who label the axes as quantities other than "Flour (cups)" and "Water (cups)" may have misunderstood the variables in the situation.

Problem 7b

Standard: MA.7.AR.4.4

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $f = 1.25w$ (or equivalent)	Response shows **conceptual understanding** with minor errors. Students who write $w = 1.25f$ or $f = \frac{4}{5}w$ may have reversed the variables in the context.	Response shows **incomplete understanding** with significant errors. Students who write $f = 1.25$ or $w = \frac{4}{5}$ may have calculated a unit rate instead of writing an equation for the relationship.	Response shows **limited understanding**. Students who write $f = w + 0.25$ may have noticed that 1 cup of water and 0.25 cups of flour makes this equation true.

Problem 7c

Standards: MA.7.AR.4.5, MTR.6.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: *Explanations vary.* The point $(1, 1.25)$ indicates that the recipe uses 1 cup of water for every 1.25 cups of flour.	Response shows **conceptual understanding** with minor errors. E.g., Response accurately describes the meaning of the point in context but lacks details such as units in the explanation.	Response shows **incomplete understanding** with significant errors. E.g., Response mentions the point in relation to water and flour, but is not clear.	Response shows **limited understanding**.

Unit 3
Show What You Know PDFs

Name: Date: Period:

Show What You Know

3.01

Complete the table so that it represents a proportional relationship.

x	y
0	0
6	20
3	
	200

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Name: Date: Period:

Show What You Know

3.02

Each row of this table represents a way to make the same color of green paint.

Blue Paint (cups)	Yellow Paint (cups)
2	10
1	5
6	30
52	260

a What is a constant of proportionality in this relationship?

b What does that constant of proportionality mean in the situation?

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Name: Date: Period:

Show What You Know

3.03

A restaurant needs 5 gallons of ice cream for dessert one night.

How many quarts of ice cream does the restaurant need?

1 gallon = 4 quarts

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Name: Date: Period:

Show What You Know

3.04

In Great Britain, two weeks is called a *fortnight*.

a Complete the table.

Weeks, w	Fortnights, f
1	
2	1
8	

b Write an equation for the number of fortnights, f, in any number of weeks, w.

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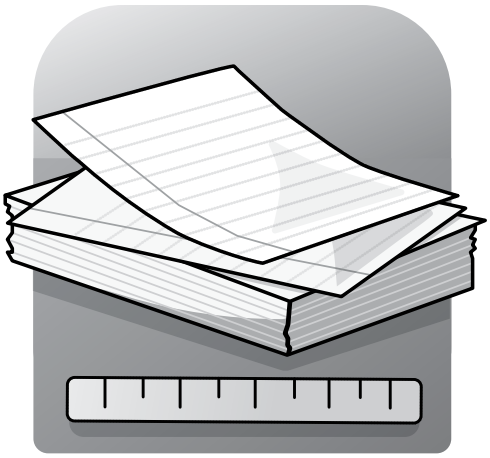
Name: Date: Period:

Show What You Know

3.05

The equation $h = 2.5r$ represents the height in inches, h, of r reams of paper.

What does 2.5 mean in this situation?



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Name: Date: Period:

Show What You Know

3.06

An albatross is a large bird that can fly 400 kilometers in 8 hours at a constant speed.

a What are *two* constants of proportionality for the relationship between distance, in kilometers, and time, in hours?

b Write *two* equations that relate distance, d, and time, t, in this situation.

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Name: Date: Period:

Show What You Know

3.07

Select *all* the equations that represent proportional relationships.

- ☐ **A.** $180 - x = y$
- ☐ **B.** $1.08x = y$
- ☐ **C.** $y = x^8$
- ☐ **D.** $y = \frac{x}{8}$
- ☐ **E.** $y = 8x$

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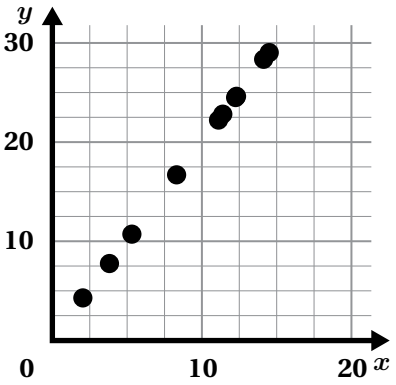
Name: Date: Period:

Show What You Know

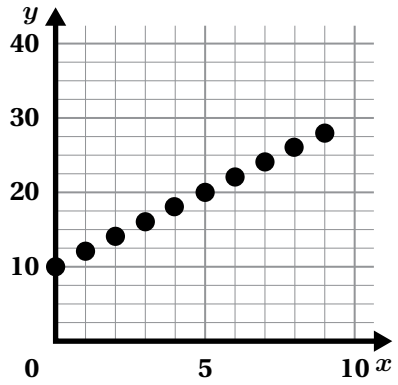
3.08

Select *all* the graphs that could represent a proportional relationship.

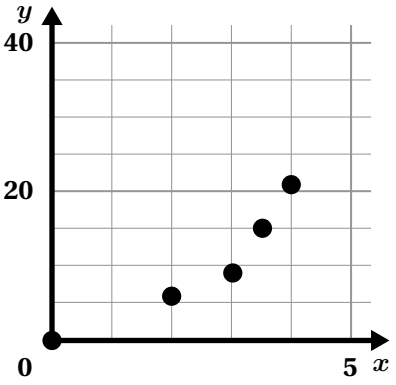
☐ A.



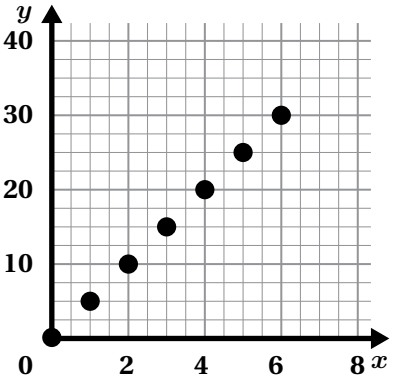
☐ B.



☐ C.



☐ D.



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Name: Date: Period:

Show What You Know

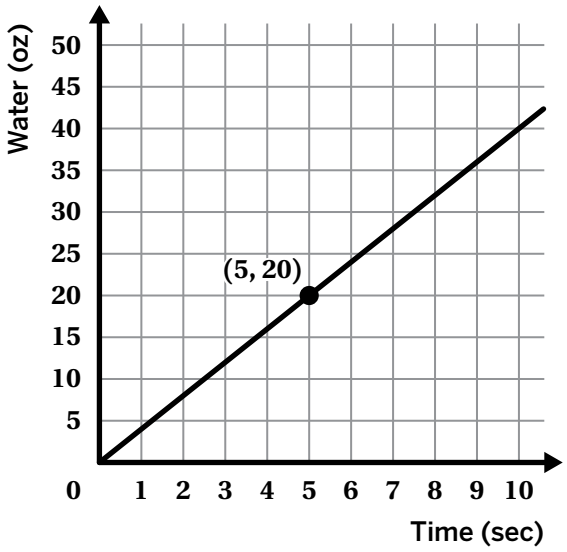
3.09

Water runs from a faucet into a bucket at a steady rate.

The relationship between the amount of water in the bucket and time is proportional.

Select *all* the true statements.

- ☐ **A.** After 20 seconds, there are 5 ounces of water in the bucket.
- ☐ **B.** A constant of proportionality for this relationship is 4.
- ☐ **C.** The point $(1, 4)$ is on the graph of the line.
- ☐ **D.** After 1 second, there are 4 ounces of water in the bucket.



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Name: Date: Period:

Show What You Know

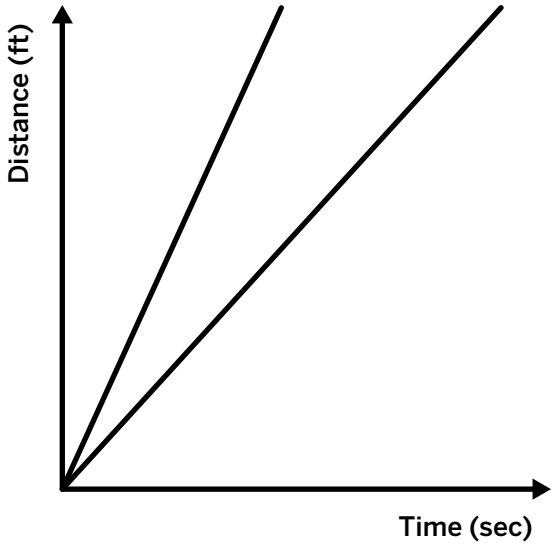
3.10

Kayla and Daniela started walking at constant speeds.

After 3 seconds:

- Kayla had walked 6 feet.
- Daniela had walked 12 feet.

a Label each graph with the name it represents.



b Write an equation for Kayla's walk, using d for distance and t for time.

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Name: Date: Period:

Show What You Know

3.11

Here are four representations of a proportional relationship. Show or explain where you can see a constant of proportionality in each representation.

Description

A baker uses 8 tablespoons of honey for every 10 cups of flour to make bread dough.

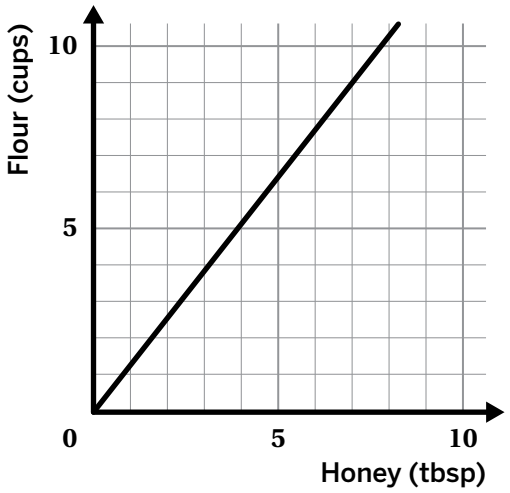
Equation

$f = 1.25h$

Table

Honey (tbsp), h	Flour (cups), f
0	0
1	1.25
2	2.5
8	10
20	25

Graph



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Show What You Know **Lesson 1**

Name: _____ Date: _____ Period: _____

Show What You Know 3.01

Complete the table so that it represents a proportional relationship.

x	y
0	0
6	20
3	10
60	200

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Show What You Know **Lesson 2**

Name: _____ Date: _____ Period: _____

Show What You Know 3.02

Each row of this table represents a way to make the same color of green paint.

Blue Paint (cups)	Yellow Paint (cups)
2	10
1	5
6	30
52	260

a. What is a constant of proportionality in this relationship?
5 or $\frac{1}{5}$

b. What does that constant of proportionality mean in the situation?
Responses vary. The constant of proportionality 5 means that this particular color of paint uses 5 cups of yellow paint for every 1 cup of blue paint.

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Show What You Know **Lesson 3**

Name: _____ Date: _____ Period: _____

Show What You Know 3.03

A restaurant needs 5 gallons of ice cream for dessert one night.

1 gallon = 4 quarts

How many quarts of ice cream does the restaurant need?
20 quarts

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Show What You Know **Lesson 4**

Name: _____ Date: _____ Period: _____

Show What You Know 3.04

In Great Britain, two weeks is called a *fortnight*.

a. Complete the table.

Weeks, w	Fortnights, f
1	0.5
2	1
8	4

b. Write an equation for the number of fortnights, f, in any number of weeks, w.
$f = 0.5w$ (or equivalent)

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Show What You Know **Lesson 5**

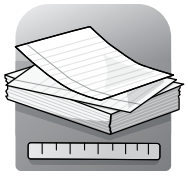
Name: _____ Date: _____ Period: _____

Show What You Know 3.05

The equation $h = 2.5r$ represents the height in inches, h, of r reams of paper.

What does 2.5 mean in this situation?

Responses vary. 2.5 inches is how tall one ream of paper is.



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Show What You Know **Lesson 6**

Name: _____ Date: _____ Period: _____

Show What You Know 3.06

An albatross is a large bird that can fly 400 kilometers in 8 hours at a constant speed.

a. What are *two* constants of proportionality for the relationship between distance, in kilometers, and time, in hours?

$\frac{400}{8}$ (or equivalent) and $\frac{8}{400}$ (or equivalent)

b. Write *two* equations that relate distance, d, and time, t, in this situation.

$d = \frac{400}{8}t$ (or equivalent) and $t = \frac{8}{400}d$ (or equivalent)

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Show What You Know **Lesson 7**

Name: _____ Date: _____ Period: _____

Show What You Know 3.07

Select *all* the equations that represent proportional relationships.

- ☐ A. $180 - x = y$
- ☑ B. $1.08x = y$
- ☐ C. $y = x^8$
- ☑ D. $y = \frac{x}{8}$
- ☑ E. $y = 8x$

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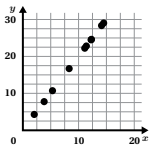
Show What You Know **Lesson 8**

Name: _____ Date: _____ Period: _____

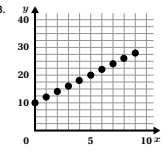
Show What You Know 3.08

Select *all* the graphs that could represent a proportional relationship.

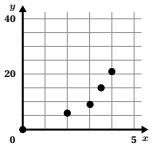
☑ A.



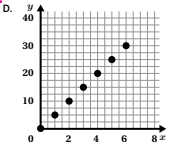
☐ B.



☐ C.



☑ D.



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Show What You Know **Lesson 9**

Name: _____ Date: _____ Period: _____

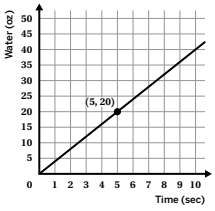
Show What You Know 3.09

Water runs from a faucet into a bucket at a steady rate.

The relationship between the amount of water in the bucket and time is proportional.

Select *all* the true statements.

- ☐ **A.** After 20 seconds, there are 5 ounces of water in the bucket.
- ☑ **B.** A constant of proportionality for this relationship is 4.
- ☑ **C.** The point (1, 4) is on the graph of the line.
- ☑ **D.** After 1 second, there are 4 ounces of water in the bucket.



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Show What You Know **Lesson 10**

Name: _____ Date: _____ Period: _____

Show What You Know 3.10

Kayla and Daniela started walking at constant speeds.

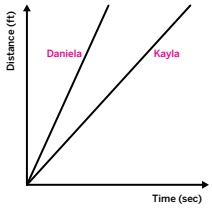
After 3 seconds:

- Kayla had walked 6 feet.
- Daniela had walked 12 feet.

a Label each graph with the name it represents.

b Write an equation for Kayla's walk, using d for distance and t for time.

$d = 2t$ (or equivalent)



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Show What You Know **Lesson 11**

Name: _____ Date: _____ Period: _____

Show What You Know 3.11

Here are four representations of a proportional relationship. Show or explain where you can see a constant of proportionality in each representation.

Description

A baker uses 8 tablespoons of honey for every 10 cups of flour to make bread dough.

Responses vary. A constant of proportionality is the number of cups of flour for each tablespoon of honey: $\frac{10}{8}$.

Equation

$f = 1.25h$

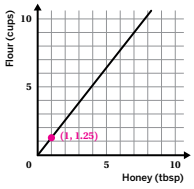
Responses vary. A constant of proportionality is k in the equation $f = kh$, so it's 1.25.

Table

Honey (tbsp), h	Flour (cups), f
0	0
(1)	(1.25)
2	2.5
8	10
20	25

Responses vary. A constant of proportionality is 1.25, which is the y-value paired with the x-value of 1.

Graph



Responses vary. The point (1, 1.25) is on the line. So a constant of proportionality is 1.25.

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Unit 4
Assessments and Rubrics

Name: ..... Date: ..... Period: .....

Pre-Unit Check

Unit 4

1. Circle *all* of the tables that could represent proportional relationships.

A.

x	y
2	3
5	7.5
10	15

B.

x	y
0	0
3	7
6	14

C.

x	y
0	2
2	4
4	6

2. To mix a particular shade of purple paint, red paint and blue paint are mixed in the ratio $5 : 3$.

Determine the number of gallons of red paint and of blue paint needed to make 20 gallons of this shade of purple paint.

Red Paint (gal)	Blue Paint (gal)

3. At one gas station, gas costs $\$2.75$ per gallon. Write an equation that relates the total cost, C, to the number of gallons of gas purchased, g.

4. A store sells ice cream with assorted toppings. The store charges $\$3.00$ for an ice cream plus $\$0.50$ per ounce of toppings.

a How much does an ice cream cost with 4 ounces of toppings?

b How much does an ice cream cost with 11 ounces of toppings?

c Alejandro's ice cream costs $\$6.50$. How much do his toppings weigh?

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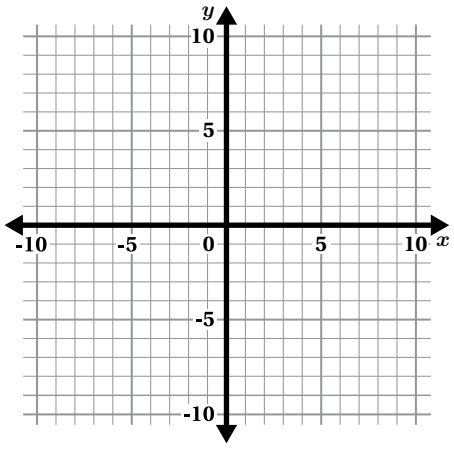
Pre-Unit Check (continued)

5. Here is a coordinate plane.



a Plot and label three different points with an x-coordinate of 3.

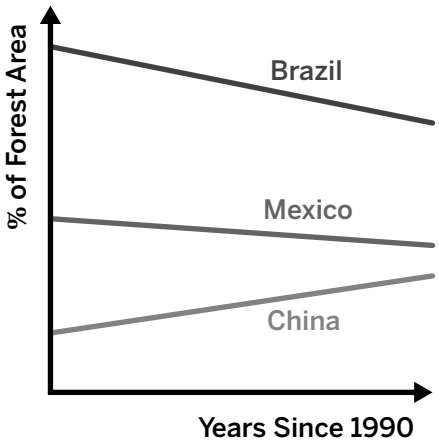
b Describe *all* of the points with an x-coordinate of 3.

Name: ..... Date: ..... Period: .....

Sub-Unit Quiz

Unit 4

1. The percentage of forest area is determined by dividing the forest area by the total land area of a region. The percentage of forest area in three countries was recorded since 1990 and is displayed in the graph.



Which statement is true?

A. The percentage of forest area in Mexico increased as time passed.

B. The percentage of forest area in Brazil decreased at a constant rate.

C. Initially, the percentage of forest area was greater in Mexico than in Brazil.

D. The percentage of forest area in Mexico decreased faster than it did in Brazil.

2. Miguel loads a transit card with $\$40$. Every time he rides the subway, $\$2$ is subtracted from the amount available on the game card.

Let y represent the amount in dollars on the card after Miguel rides the subway x times.

Which equation represents this situation?

A. $y = 2 - 40x$

B. $y = -40 + 2x$

C. $y = -2x + 40$

D. $y = 40x - 2$

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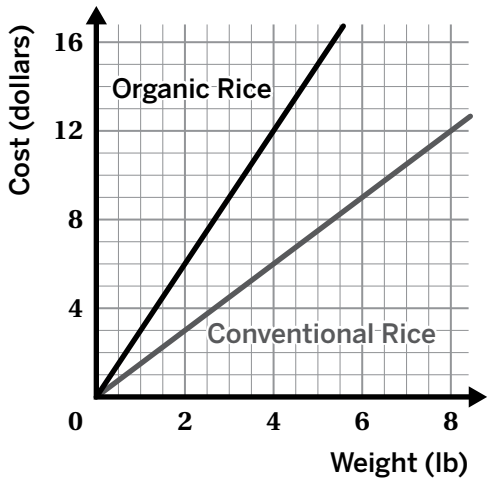
3. The graph shows the cost vs. weight relationship for two types of rice that can be bought at a bulk food store.



Select *all* of the true statements.

- ☐ **A.** The cost vs. weight relationships for both organic and conventional rice are proportional relationships.
- ☐ **B.** The cost as a unit rate for conventional rice is $\$1.50$ per pound.
- ☐ **C.** Conventional rice costs twice as much per pound as organic rice.
- ☐ **D.** It costs $\$8$ to buy 12 pounds of conventional rice.
- ☐ **E.** The relationship between cost, c, and weight, w, for organic rice can be represented by the equation $c = 3w$.

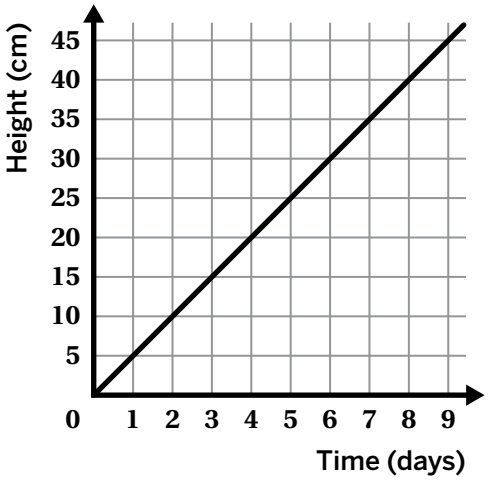
4. Nicolas planted three seeds. Each grew at a different constant rate. He measured the height of each plant every day and recorded his data below.

The table, the graph, and the equation show the relationship between time, t, in days and height, h, in centimeters for each of the plants.

Plant 1

Time (days)	Height (cm)
2	6
4	12
6	18
8	24
10	30

Plant 2



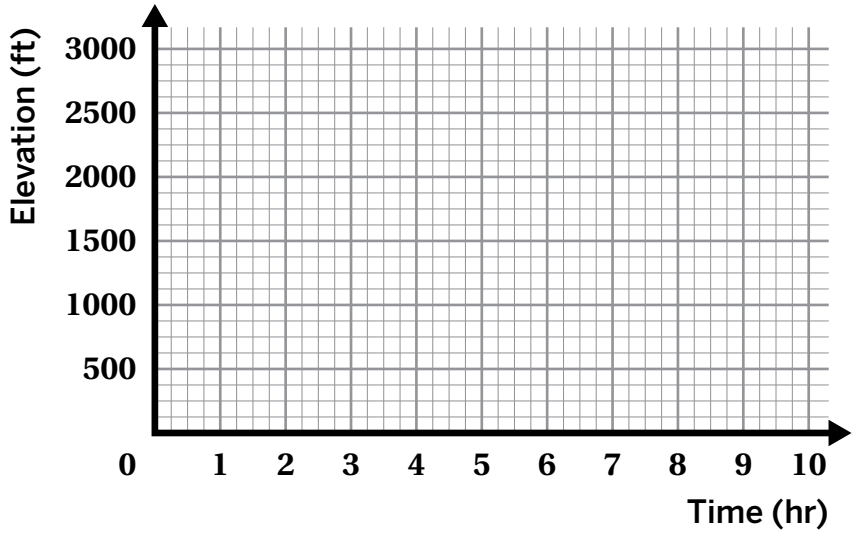
Plant 3

$h = 1.5t$

Which of the three plants grew the fastest? Explain your thinking.

5. Marquis started at an elevation of $3{,}000$ feet and hiked down a mountain at a constant rate. His elevation decreased 500 feet per hour.

a Graph the relationship between Marquis' elevation and time as he hiked down the mountain.



b Complete the table showing Marquis' elevation at different times during his hike.

Time (hr)	Elevation (ft)
0	
	2000
5	

c Write an equation relating the number of hours hiked, t, and Marquis' elevation in feet, f.

Standard	MA.8.AR.3.2	MA.8.AR.3.3	MA.8.AR.3.4	MA.8.AR.3.5
Problem(s)	3, 4	2, 3, 5c	5a	1, 4, 5b

Problem 1

Standard: MA.8.AR.3.5, MTR.7.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: The percentage of forest area in Brazil decreased at a constant rate.			**Incorrect** choice. Students who select *The percentage of forest area in Mexico decreased faster than it did in Brazil* may have noticed that the percentage of forest area is decreasing for both Mexico and Brazil.

Problem 2

Standard: MA.8.AR.3.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: $y = -2x + 40$			**Incorrect** choice. Students who select $y = 40x - 2$ may have confused the meaning of the slope and y-intercept when selecting an equation that represents the situation.

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Problem 3

Standards: MA.8.AR.3.2, MA.8.AR.3.3, MTR.7.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
All correct choices and **no incorrect** choices. • **The cost vs. weight relationships for both organic and conventional rice are proportional relationships.** • **The cost as a unit rate for conventional rice is $\$1.50$ per pound.** • **The relationship between cost, c, and weight, w, for organic rice can be represented by the equation $c = 3w$.**	**One or two correct** choices and **no incorrect** choices. **All correct** choices and **one incorrect** choice.	**One or two correct** choices and **one incorrect** choice.	**Only incorrect** choices. **Two or more incorrect** choices with some correct choices.

Problem 4

Standards: MA.8.AR.3.2, MA.8.AR.3.5, MTR.2.1

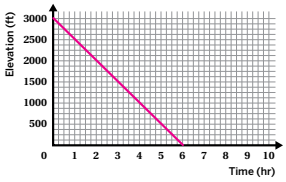
4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete explanation.** **Plant 2 grew the fastest. *Explanations vary.* The table shows that Plant 1 is 6 cm taller every 2 days, so Plant 1 grew 3 cm each day. The line in the graph has a slope of 5, so Plant 2 grew 5 cm per day. Plant 3's equation shows that it grew 1.5 cm each day.**	Response shows **conceptual understanding** with minor errors. E.g., Correct response with minor flaws in explanation. E.g., Response includes minor arithmetic errors in calculating slope from Plant 1 or Plant 2. Students who choose Plant 1 may not have noticed the x-values increase by 2 in each row.	**Correct** response with **incomplete** explanation. E.g., Response includes explanation of finding slope for two of the plants. **Incorrect** response with explanation that shows **partial understanding**. E.g., Students switch the x- and y-values when finding the slope for Plant 1 or Plant 2.	**Incorrect** response with **no** explanation.

Problem 5a

Standards: MA.8.AR.3.4, MTR.7.1

4 Meeting

Correct graph:



3 Approaching

Graph shows **conceptual understanding** with minor errors.

E.g., Response includes "lines with a y-intercept of 3000" or "a slope of -500" but not both.

2 Developing

Graph shows **incomplete understanding** with significant errors.

1 Beginning

Graph shows **limited understanding**.

Problem 5b

Standards: MA.8.AR.3.5, MTR.2.1, MTR.7.1

4 Meeting

Correct response:

Time (hr)	Elevation (ft)
0	**3000**
2	2000
5	**500**

3 Approaching

Response shows **conceptual understanding** with minor errors.

E.g., Two correct responses.

2 Developing

Response shows **incomplete understanding** with significant errors.

E.g., One correct response.

1 Beginning

Response shows **limited understanding**.

Problem 5c

Standards: MA.8.AR.3.3, MTR.2.1, MTR.7.1

4 Meeting

Correct response:
$f = 3000 - 500t$ (or equivalent)

3 Approaching

Response shows **conceptual understanding** with minor errors.

Students who write $f = 3000t - 500$ may understand that the elevation started at 3000 feet and decreases by 500 feet each hour.

2 Developing

Response shows **incomplete understanding** with significant errors.

Students who write $f = 3000 - 500$ may understand that the elevation started at 3000 feet and decreases by 500 feet each hour.

1 Beginning

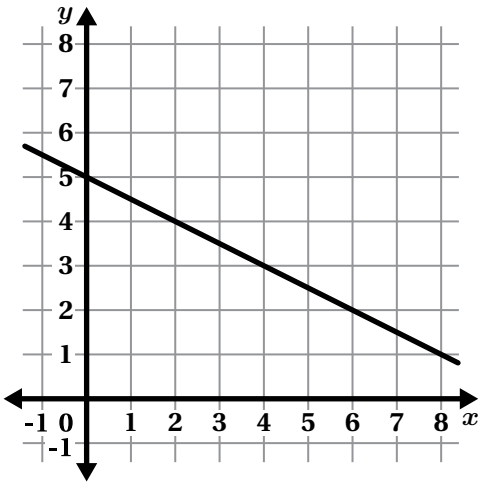
Response shows **limited understanding**.

Name: ..... Date: ..... Period: .....

End-of-Unit Assessment

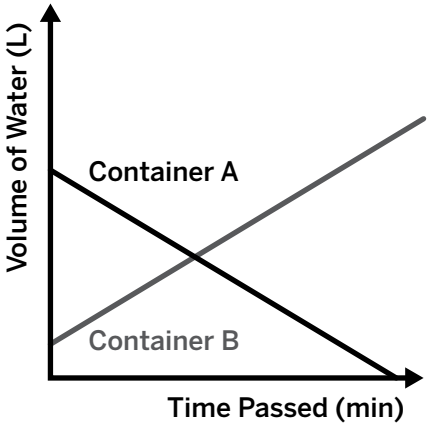
Unit 4

1. This graph shows the line $y = -\frac{1}{2}x + 5$. Select *all* of the points that are solutions to the equation.



- ☐ **A.** $(0, 5)$
- ☐ **B.** $(0, 10)$
- ☐ **C.** $(1, 2)$
- ☐ **D.** $(5, 0)$
- ☐ **E.** $(10, 0)$

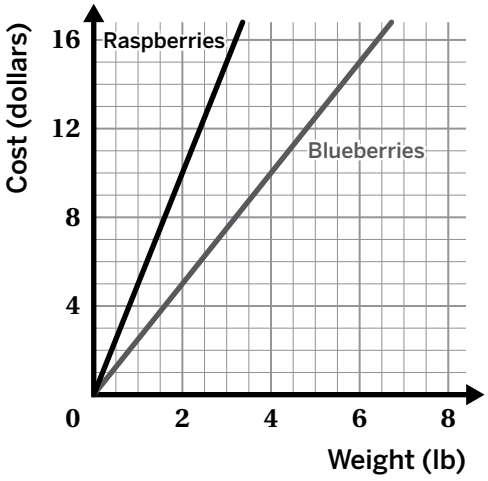
2. This graph shows the amount of water in each container as the water in Container A is poured into Container B.



Which statement is true?

- (A.) The relationship between time and amount of water for Container A is proportional.
- (B.) The amount of water in Container A decreased at a constant rate.
- (C.) Initially, there was more water in Container B than in Container A.
- (D.) The amount of water in Container A increased each minute.

3. The graph shows the cost vs. weight relationship for blueberries and raspberries.



Select *all* of the true statements.

- ☐ **A.** The cost vs. weight relationship for both blueberries and raspberries are proportional relationships.
- ☐ **B.** The cost as a unit rate for blueberries is $5 per pound.
- ☐ **C.** Raspberries cost half as much as blueberries.
- ☐ **D.** It costs $10 to buy 4 pounds of raspberries.
- ☐ **E.** The relationship between cost, c, and weight, w, for raspberries can be represented by the equation $c = 5w$.

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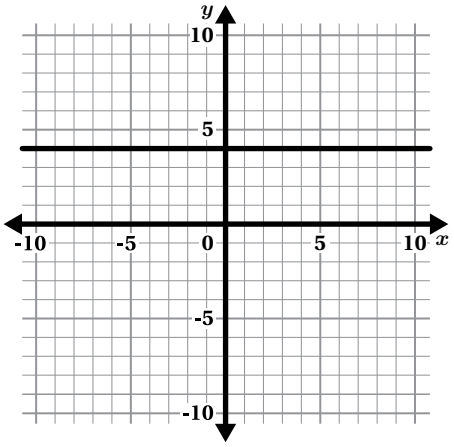
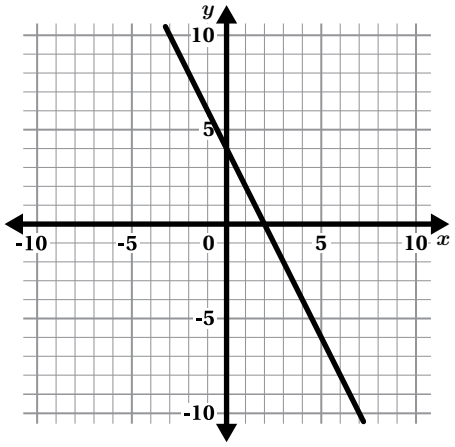
4. Write an equation for each line.

a



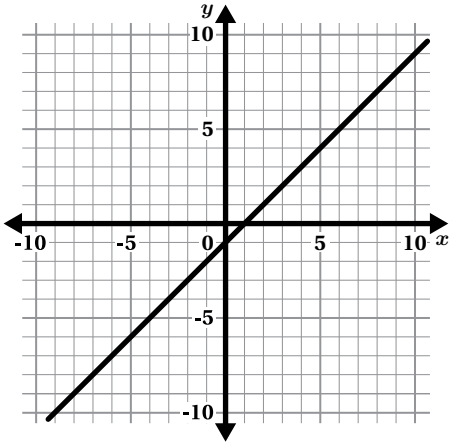
Equation: .....

b



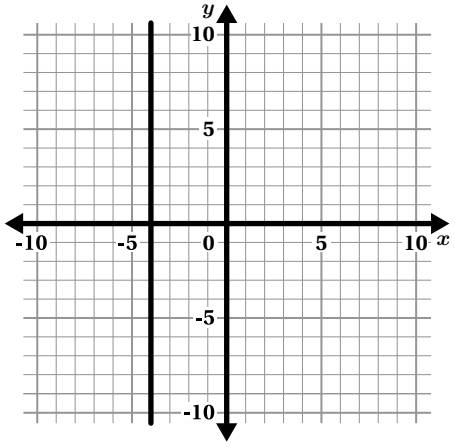
Equation: .....

c



Equation: .....

d



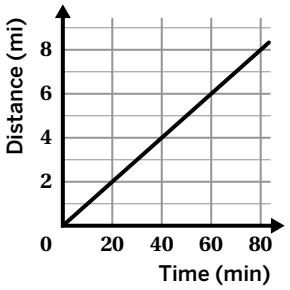
Equation: .....

End-of-Unit Assessment (continued)

Unit 4

5. One day, three runners ran 10 miles, each at a different constant speed.

Runner 1



Runner 2

Time (min)	Distance (mi)
18	2
36	4
54	6
72	8
90	10

Runner 3

$$d = \frac{1}{8}t$$

t time (minutes)
d distance (miles)

Which runner ran the fastest? Explain your thinking.

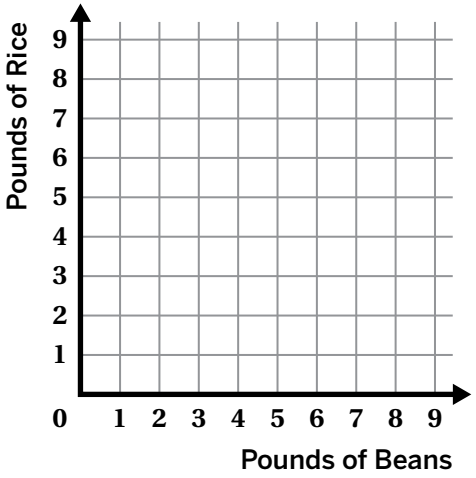
6. Beans cost \$1.50 per pound. Rice costs \$1.00 per pound. Joel has \$7.50 for beans and rice.

a Complete the table showing three ways Joel can spend exactly \$7.50 on beans and rice.

Pounds of Beans, b	Pounds of Rice, r
1	
	3
5	

b Write an equation that represents the pounds of beans, b, and rice, r, Joel can buy for \$7.50.

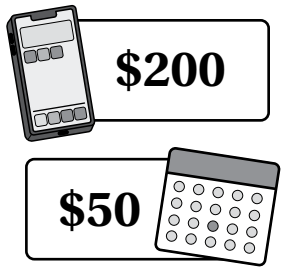
c Draw a graph of the pounds of beans, b, and rice, r, Joel can buy for \$7.50.



End-of-Unit Assessment (continued)

Unit 4

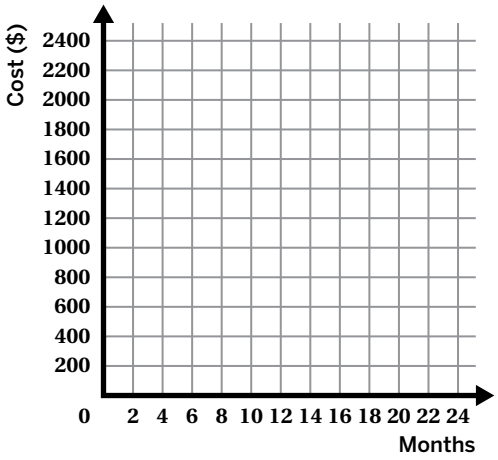
7. A cell phone plan costs $\$200$ to start. Then there is a $\$50$ charge each month.



a What is the total cost (startup fee and monthly charge) to use the cell phone plan for 2 months?

b Write an equation to represent the total cost, y, to use the cell phone plan for x months.

c Graph the relationship between total cost and number of months.



d A new cell phone plan costs $\$100$ to start. Then there is a $\$50$ charge each month. Describe how the *graph* of this new plan would be the same and how it would be different.

Standard	MA.8.AR.3.1	MA.8.AR.3.2	MA.8.AR.3.3	MA.8.AR.3.4	MA.8.AR.3.5	MA.8.AR.4.1
Problem(s)	3	3, 5, 6a	3, 4, 6b, 7b	6c, 7c	2, 7a, 7d	1

Problem 1

Standard: MA.8.AR.4.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Both correct choices and **no incorrect** choices. • $(0, 5)$ • $(10, 0)$	**One correct** choice and **no incorrect** choices. **Both correct** choices and **one incorrect** choice.	**One correct** choice and **one incorrect** choice.	**Only incorrect** choices. **Two or more incorrect** choices with some correct choices.

Problem 2

Standards: MA.8.AR.3.5, MTR.6.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: The amount of water in Container A decreased at a constant rate.			**Incorrect** choice.

Problem 3

Standards: MA.8.AR.3.1, MA.8.AR.3.2, MA.8.AR.3.3, MTR.3.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
All correct choices and **no incorrect** choices. • The cost vs. weight relationship for both blueberries and raspberries are proportional relationships. • It cost \$10 to buy 4 pounds of raspberries. • The relationship between cost, c, and weight, w, for raspberries can be represented by the equation $c = 5w$.	**One, two, or three correct** choices and **no incorrect** choice.	**One, two, or three** choices and **one incorrect** choice.	**One or two correct** choices and **one incorrect** choice.

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Problem 4a

Standard: MA.8.AR.3.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $y = 4$	Response shows **conceptual understanding** with minor errors. Students who write $x = 4$ or 4 may not understand the meaning of the equation of a line.	Response shows **incomplete understanding** with significant errors. Students who write $y = 4x$ or $y = 4x + 4$ may be familiar with the equation of a line, but not understand what each value represents.	Response shows **limited understanding**.

Problem 4b

Standard: MA.8.AR.3.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $y = 4 - 2x$ (or equivalent)	Response shows **conceptual understanding** with minor errors. Students who write $y = 2x + 4$ may have correctly identified the y-intercept, but may not understand the difference between positive and negative slopes.	Response shows **incomplete understanding** with significant errors. Students who write $y = -2x$ or $y = 4$ may have correctly identified the y-intercept or slope, but not both.	Response shows **limited understanding**.

Problem 4c

Standard: MA.8.AR.3.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $y = x - 1$ (or equivalent)	Response shows **conceptual understanding** with minor errors. Students who write $y = x + 1$ or $y = -x - 1$ may have correctly identified the slope or y-intercept, but made an error interpreting the signs.	Response shows **incomplete understanding** with significant errors. Students who write $y = 1x$ or $y = -1$ may have correctly identified the y-intercept or slope, but not both.	Response shows **limited understanding**.

Problem 4d

Standard: MA.8.AR.3.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $x = -4$	Response shows **conceptual understanding** with minor errors. Students who write $y = 4$ or 4 may recall that often the equation of a line begins with $y =$ [something].	Response shows **incomplete understanding** with significant errors. Students who write $y = -4x - 4$ may be familiar with the equation of a line, but not understand what each value represents.	Response shows **limited understanding**.

Problem 5

Standards: MA.8.AR.3.2, MTR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. **Runner 3.** ***Explanations vary.*** **Runner 1's rate is 1 mile every 10 minutes. Runner 2's rate is 1 mile every 9 minutes. Runner 3's rate is 1 mile every 8 minutes.**	Response shows **conceptual understanding** with minor errors. E.g., Correct response with minor flaws in explanation. E.g., Incorrect response with logical and complete explanation. Students who select Runner 1 may think that the greatest number of minutes per mile corresponds to the fastest pace.	Response shows **incomplete understanding** with significant errors. E.g., Correct response with incomplete explanation. E.g., Incorrect response with explanation that communicates partial understanding. Students who select Runner 2 may have only compared Runners 1 and 2 and concluded that Runner 2 was faster without considering Runner 3's equation.	Response shows **limited understanding.** E.g., Incorrect response with incorrect explanation or without an explanation.

Problem 6a

Standards: MA.8.AR.3.2, MTR.6.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct responses: • **(1, 6)** • **(3, 3)** • **(5, 0)**	Response shows **conceptual understanding** with minor errors. E.g., Two correct responses.	Response shows **incomplete understanding** with significant errors. E.g., One correct response.	Response shows **limited understanding**. E.g., Work does not consider the $7.50 constraint.

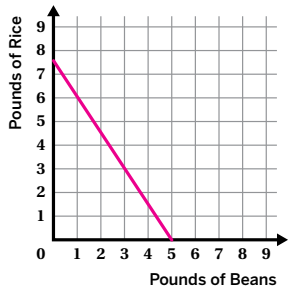
Problem 6b

Standards: MA.8.AR.3.3, MTR.6.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $1.5b + 1r = 7.5$, or a correct equation based on an incorrect table in 6a.	Response shows **conceptual understanding** with minor errors.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding**.

Problem 6c

Standards: MA.8.AR.3.4, MTR.6.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct graph:  	Graph shows **conceptual understanding** with minor errors. E.g., Graph contains only the three points from the table, even if the table is incorrect.	Graph shows **incomplete understanding** with significant errors. E.g., Reasonable graph that includes a line but is not based on the given relationship.	Graph shows **limited understanding**.

Problem 7a

Standards: MA.8.AR.3.5, MTR.7.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $300	Response shows **conceptual understanding** with minor errors.	Response shows **incomplete understanding** with significant errors. Students who write $500 may have calculated the cost for 1 month and then doubled it.	Response shows **limited understanding**.

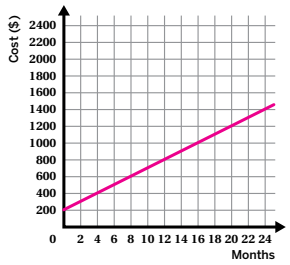
Problem 7b

Standards: MA.8.AR.3.3, MTR.7.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $y = 200 + 50x$	Response shows **conceptual understanding** with minor errors.	Response shows **incomplete understanding** with significant errors. Students who write $y = 50 + 200x$ (or equivalent) may recognize that the relationship is linear.	Response shows **limited understanding**.

Problem 7c

Standards: MA.8.AR.3.4, MTR.7.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response:  	Graph shows **conceptual understanding** with minor errors.	Graph shows **incomplete understanding** with significant errors. E.g., Graph has the correct slope but does not include the starting cost.	Graph shows **limited understanding**.

Problem 7d

Standards: MA.8.AR.3.5, MTR.7.1

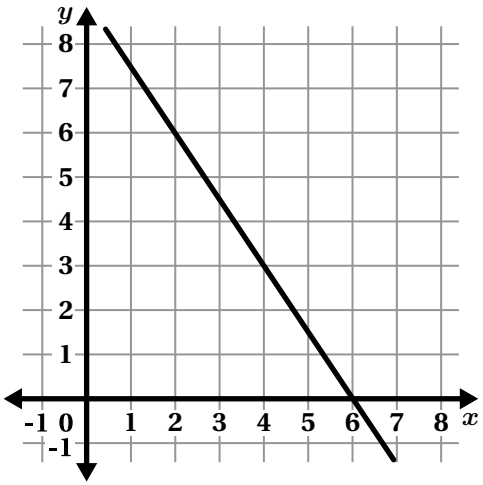
4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: ***Responses vary.*** **The graph of the new plan would have a different vertical intercept but the same slope as the graph of the first plan. The lines would be parallel to each other because their slopes are the same.**	Response shows **conceptual understanding** with minor errors. E.g., Response only describes how the graphs would be the same or different, but not both.	Response shows **incomplete understanding** with significant errors. E.g., Response discusses the context but does not compare the graphs.	Response shows **limited understanding**.

Name: ..... Date: ..... Period: .....

End-of-Unit Assessment

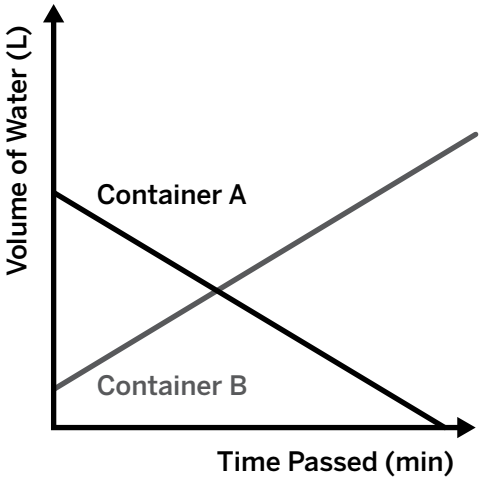
Unit 4

1. This graph shows the line $y = -\frac{3}{2}x + 9$. Select *all* of the points that are solutions to the equation.



- ☐ **A.** $(0, 6)$
- ☐ **B.** $(0, 9)$
- ☐ **C.** $(2, 6)$
- ☐ **D.** $(6, 0)$
- ☐ **E.** $(9, 0)$

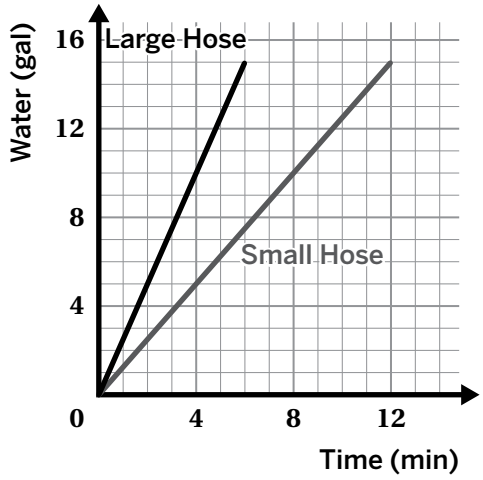
2. This graph shows the amount of water in each container as the water in Container A is poured into Container B.



Which statement is true?

- (A.) The amount of water in Container A increased each minute.
- (B.) The amount of water in Container B decreased at a constant rate.
- (C.) The relationship between time and amount of water for Container B is proportional.
- (D.) Initially, there was more water in Container A than in Container B.

3. The graph shows the amount of water in the pool vs. time relationship for filling a kiddie pool with a small hose and a large hose.



Select *all* of the true statements.

- ☐ **A.** The amount of water in the pool vs. time relationship for both the large and small hoses are proportional relationships.
- ☐ **B.** It takes 6 minutes to fill the pool with the large hose and 12 minutes with the small hose.
- ☐ **C.** The speed as a unit rate for filling the pool with the large hose is 2.5 gallons per minute.
- ☐ **D.** If the pool is filled with the small hose for 4 minutes it will have 10 gallons of water.
- ☐ **E.** The relationship between time, t, and the amount of water, w, for the small hose can be represented by the equation $w = 2.5t$.

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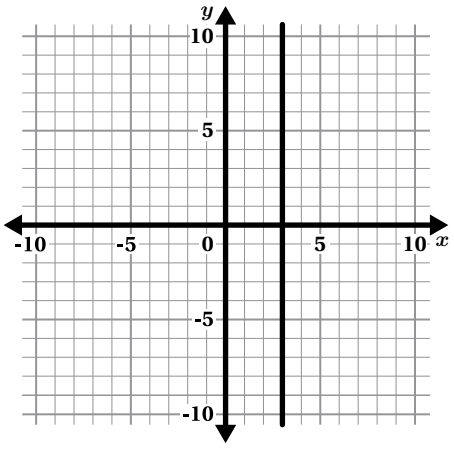
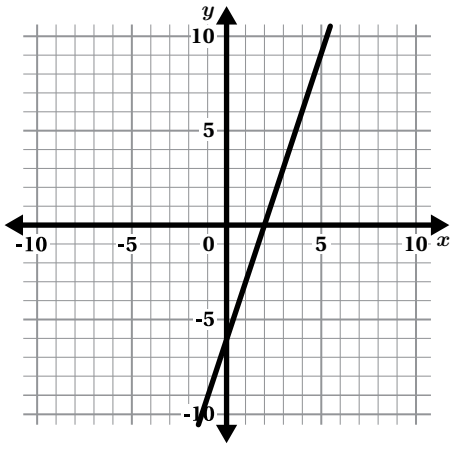
4. Write an equation for each line.

a



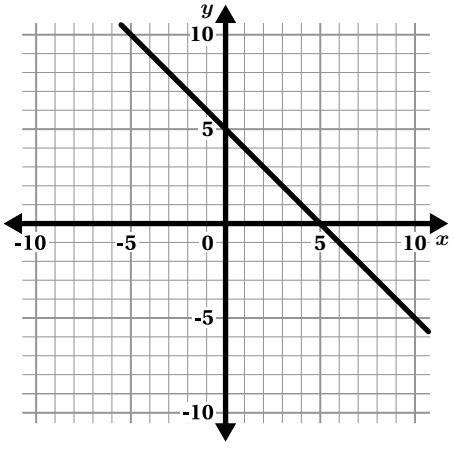
Equation: .....

b



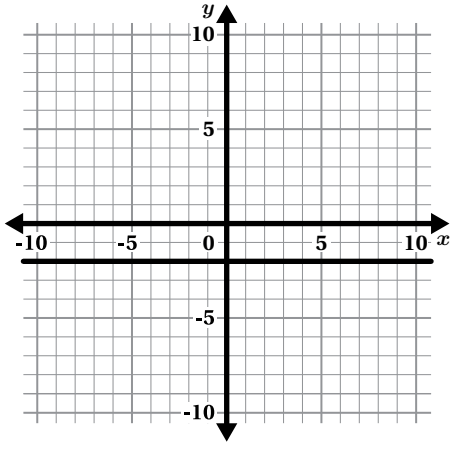
Equation: .....

c



Equation: .....

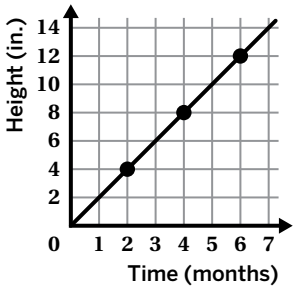
d



Equation: .....

5. Amir is growing three plants. He keeps track of each plant's height over time.

Plant 1



Plant 2

Time (months)	Height (in.)
2	5
4	10
6	15
8	20
10	25

Plant 3

$h = 3.5t$

t time (months)
h height (in.)

Which plant is growing the slowest? Explain your thinking.

6. A truck delivers tables and chairs for a fair. The truck can carry $1{,}000$ pounds total.

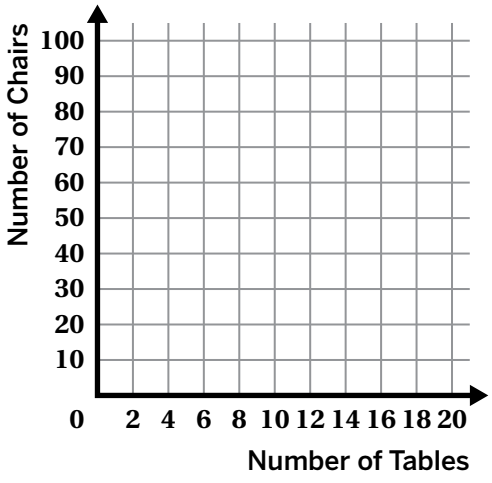
- Tables weigh 50 pounds each.
- Chairs weigh 10 pounds each.

a Complete the table showing three ways the truck can be packed with tables and chairs.

Number of Tables, t	Number of Chairs, c
1	
	60
20	

b Write an equation that represents the number of tables, t, and the number of chairs, c, that the truck can carry.

c Draw a graph of the number of tables, t, and the number of chairs, c, that the truck can carry.



End-of-Unit Assessment (continued)

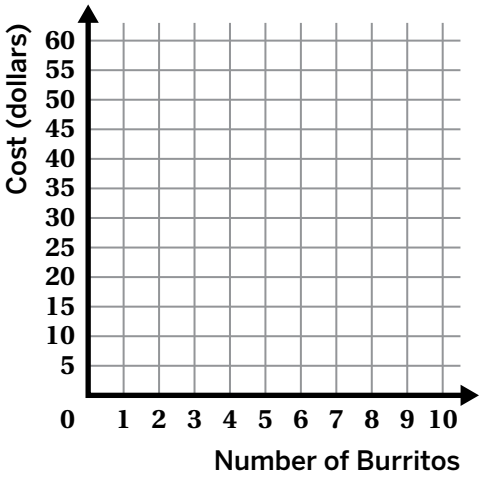
Unit 4

7. A restaurant charges $\$10$ for each burrito, and a $\$5$ delivery fee.

a What is the total cost to have 4 burritos delivered?

b Write an equation to represent the total cost, y, to have x burritos delivered.

c Graph the relationship between total cost and number of burritos.



d A new restaurant charges $\$7$ for each burrito, and a $\$5$ delivery fee. Describe how the *graph* of this new restaurant's burrito delivery would be the same and how it would be different.

Standard	MA.8.AR.3.1	MA.8.AR.3.2	MA.8.AR.3.3	MA.8.AR.3.4	MA.8.AR.3.5	MA.8.AR.4.1
Problem(s)	3	3, 5, 6a	3, 4, 6b, 7b	6c, 7c	2, 7a, 7d	1

Problem 1

Standard: MA.8.AR.4.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
All correct choices and **no incorrect** choices. • $(0, 9)$ • $(2, 6)$ • $(6, 0)$	**One or two correct** choices and **no incorrect** choices. **All correct** choices and **one incorrect** choice.	**One or two correct** choices and **one incorrect** choice.	**Only incorrect** choices. **Two or more incorrect** choices with some correct choices.

Problem 2

Standards: MA.8.AR.3.5, MTR.6.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: Initially, there was more water in Container A than in Container B.			**Incorrect** choice.

Problem 3

Standards: MA.8.AR.3.1, MA.8.AR.3.2, MA.8.AR.3.3, MTR.3.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
All correct choices and **no incorrect** choices. • The amount of water in the pool vs. time relationship for both the large and small hoses are proportional relationships. • It takes 6 minutes to fill the pool with the large hose and 12 minutes with the small hose. • The speed as a unit rate for filling the pool with the large hose is 2.5 gallons per minute.	**One or two correct** choices and **no incorrect** choices. **All correct** choices and **one incorrect** choice.	**One or two correct** choices and one **incorrect** choice.	**Only incorrect** choices. **Two or more incorrect** choices with some correct choices.

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Problem 4a

Standard: MA.8.AR.3.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $x = 3$	Response shows **conceptual understanding** with minor errors. Students who write $y = 3$ or 3 may recall that often the equation of a line begins with $y =$ [something].	Response shows **incomplete understanding** with significant errors. Students who write $y = 3x + 3$ may be familiar with the equation of a line, but not understand what each value represents.	Response shows **limited understanding**.

Problem 4b

Standard: MA.8.AR.3.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $y = -6 + 3x$ (or equivalent)	Response shows **conceptual understanding** with minor errors. Students who write $y = 3x + 6$ or $y = -3x - 6$ may have correctly identified the slope or y-intercept, but made an error interpreting the sign of one of them.	Response shows **incomplete understanding** with significant errors. Students who write $y = 3x$ or $y = -6$ may have correctly identified the y-intercept or slope, but not both.	Response shows **limited understanding**.

Problem 4c

Standard: MA.8.AR.3.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $y = -x + 5$ (or equivalent)	Response shows **conceptual understanding** with minor errors. Students who write $y = x + 5$ may have correctly identified the y-intercept, but may not understand the difference between positive and negative slopes.	Response shows **incomplete understanding** with significant errors. Students who write $y = x$ or $y = 5$ may have correctly identified the y-intercept or slope, but not both.	Response shows **limited understanding**.

Problem 4d

Standard: MA.8.AR.3.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $y = -2$	Response shows **conceptual understanding** with minor errors. Students who write $x = -2$ or -2 may not understand the meaning of the equation of a line.	Response shows **incomplete understanding** with significant errors. Students who write $y = -2x$ or $y = -2x + 2$ may be familiar with the equation of a line, but not understand what each value represents.	Response shows **limited understanding**.

Problem 5

Standards: MA.8.AR.3.2, MTR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete explanation**. Plant 1. *Explanations vary.* Plant 1 grows 2 inches every month. Plant 2 grows 2.5 inches every month. Plant 3 grows 3.5 inches every month.	Response shows **conceptual understanding** with minor errors. E.g., Correct response with minor flaws in explanation. E.g., Incorrect response with logical and complete explanation. Students who select Plant 3 may have answered the question "Which plant is growing the fastest?"	Response shows **incomplete understanding** with significant errors. E.g., Correct response with incomplete explanation. E.g., Incorrect response with explanation that communicates partial understanding. Students who select Plant 2 may have only compared Plants 2 and 3 and concluded that Plant 2 was growing slower without considering Plant 1's graph.	Response shows **limited understanding**. E.g., Incorrect response with incorrect explanation or without an explanation.

Problem 6a

Standards: MA.8.AR.3.2, MTR.6.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct responses: • $(1, 95)$ • $(8, 60)$ • $(20, 0)$	Response shows **conceptual understanding** with minor errors. E.g., Two correct responses.	Response shows **incomplete understanding** with significant errors. E.g., One correct response.	Response shows **limited understanding**. E.g., Work does not consider the $1{,}000$-pound constraint.

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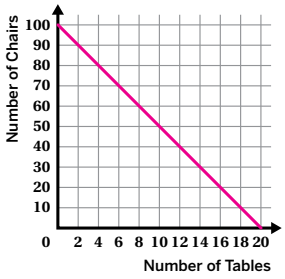
Problem 6b

Standards: MA.8.AR.3.3, MTR.6.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $50t + 10c = 1000$ (or equivalent), or a correct equation based on an incorrect table in 6a.	Response shows **conceptual understanding** with minor errors.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding**.

Problem 6c

Standards: MA.8.AR.3.4, MTR.6.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct graph:  	Graph shows **conceptual understanding** with minor errors. E.g., Graph contains only the three points from the table, even if the table is incorrect.	Graph shows **incomplete understanding** with significant errors. E.g., Reasonable graph that includes a line but is not based on the given relationship.	Graph shows **limited understanding**.

Problem 7a

Standards: MA.8.AR.3.5, MTR.7.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $45	Response shows **conceptual understanding** with minor errors.	Response shows **incomplete understanding** with significant errors. Students who write $60 may have calculated the cost to deliver 1 burrito and then multiplied by 4.	Response shows **limited understanding**.

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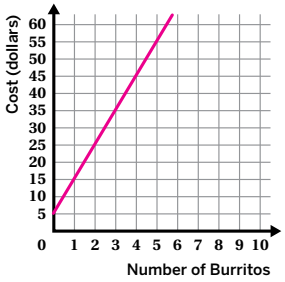
Problem 7b

Standards: MA.8.AR.3.3, MTR.7.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $y = 5 + 10x$	Response shows **conceptual understanding** with minor errors.	Response shows **incomplete understanding** with significant errors. Students who write $y = 5x + 10$ (or equivalent) may recognize that the relationship is linear.	Response shows **limited understanding**.

Problem 7c

Standards: MA.8.AR.3.4, MTR.7.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response:  	Graph shows **conceptual understanding** with minor errors.	Graph shows **incomplete understanding** with significant errors. E.g., Graph has the correct slope but does not include the starting cost.	Graph shows **limited understanding**.

Problem 7d

Standards: MA.8.AR.3.5, MTR.7.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: ***Responses vary.*** **The graph for the new restaurant would have the same vertical intercept but a different slope from the graph of the first restaurant. The lines would not be parallel to each other because their slopes are different.**	Response shows **conceptual understanding** with minor errors. E.g., Response only describes how the graphs would be the same or different, but not both.	Response shows **incomplete understanding** with significant errors. E.g., Response discusses the context but does not compare the graphs.	Response shows **limited understanding**.

Unit 4
Show What You Know PDFs

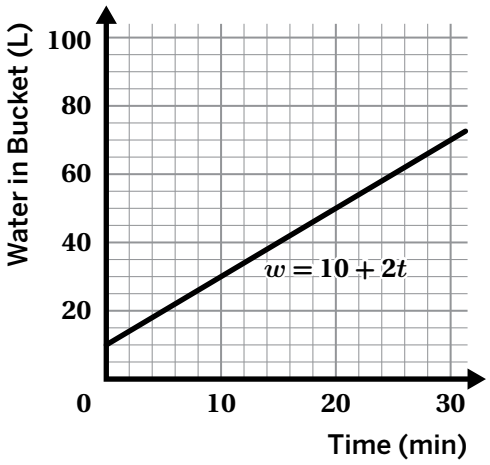
Name: Date: Period:

Show What You Know

4.01

Ada is filling a bucket with water.

The graph shows the relationship between the amount of water in the bucket, w, and time passed, t.



Select *all* the true statements.

- ☐ **A.** The bucket fills at a rate of 2 liters per minute.
- ☐ **B.** The bucket fills at a rate of 10 liters per minute.
- ☐ **C.** The bucket starts with 10 liters of water in it.
- ☐ **D.** The relationship is proportional.
- ☐ **E.** The relationship is linear.

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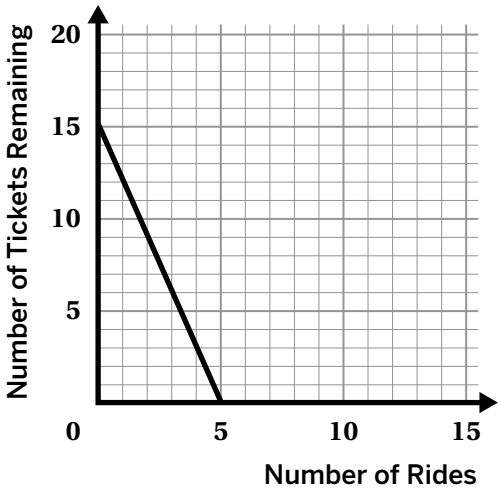
Name: Date: Period:

Show What You Know

4.02

Marc purchased tickets to ride roller coasters at a carnival. The graph shows the relationship between the number of tickets remaining, y, after x rides.



a Complete the table.

Vertical Intercept (x, y)	Horizontal Intercept (x, y)

b What does each point represent in this situation?

Vertical Intercept:

Horizontal Intercept:

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Name: Date: Period:

Show What You Know

4.03

Sahana loads an arcade game card with $\$50$. Every time she plays a game, $\$3$ is subtracted from the amount available on the game card.

Let y represent the amount in dollars on the card after Sahana plays x games.

Which equation represents this situation?

A. $y = 50 + 3x$

B. $y = 3 - 50x$

C. $y = -50x - 3$

D. $y = -3x + 50$

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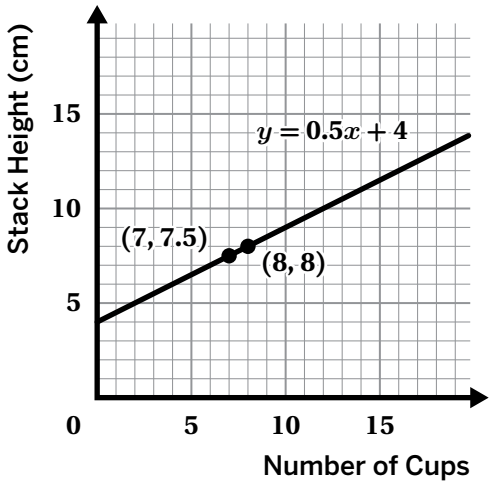
Name: Date: Period:

Show What You Know

4.04

Here is a graph that represents a different stack of cups.



a What is the slope of this linear relationship?

b What does the slope represent in this situation?

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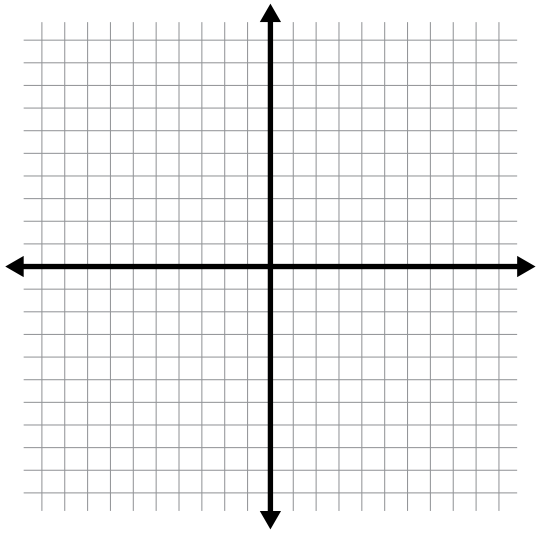
Name: Date: Period:

Show What You Know

4.05

Calculate the slope of the line that goes through $(1, 3)$ and $(9, 6)$. Use the graph if it helps with your thinking.



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Name: Date: Period:

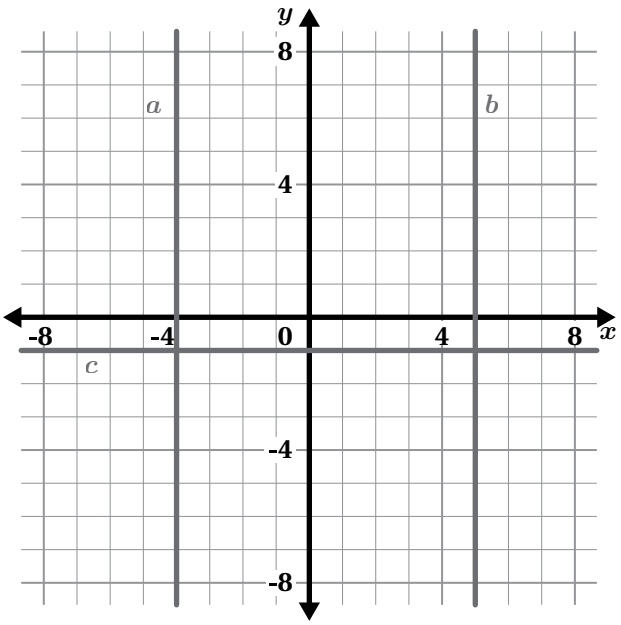
Show What You Know

4.06

Here are three lines on a coordinate plane.

Write an equation for each line.

Line	Equation
a	
b	
c	



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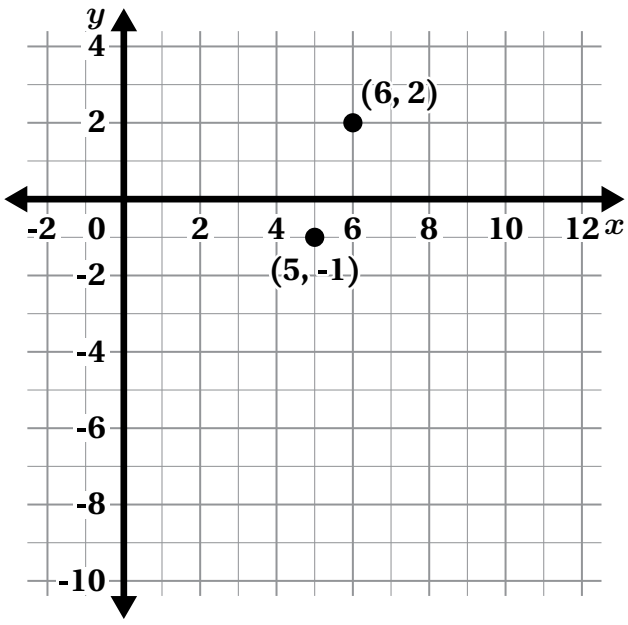
Name: Date: Period:

Show What You Know

4.07

Write an equation of a line that goes through $(5, -1)$ and $(6, 2)$.



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Name: Date: Period:

Show What You Know

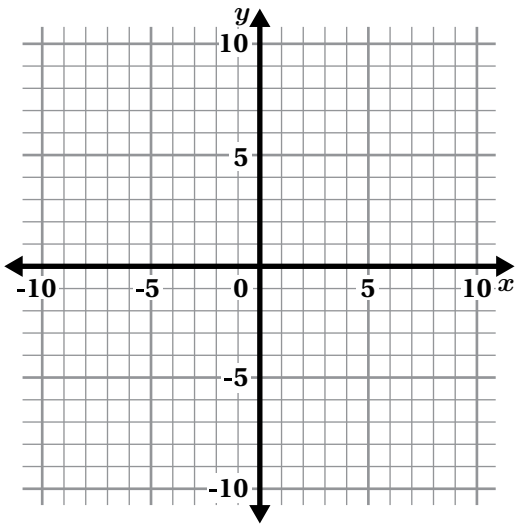
4.08

The graph of a linear equation includes the points $(-2, 0)$ and $(0, 6)$.

Could $y = 3x + 6$ be an equation for this line?

Yes No There is not enough information

Explain your thinking.



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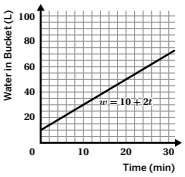
Show What You Know **Lesson 1**

Name: _____ Date: _____ Period: _____

Show What You Know 4.01

Ada is filling a bucket with water.

The graph shows the relationship between the amount of water in the bucket, w, and time passed, t.



Select *all* the true statements.

- [x] **A.** The bucket fills at a rate of 2 liters per minute.
- [ ] **B.** The bucket fills at a rate of 10 liters per minute.
- [x] **C.** The bucket starts with 10 liters of water in it.
- [ ] **D.** The relationship is proportional.
- [x] **E.** The relationship is linear.

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Show What You Know **Lesson 2**

Name: _____ Date: _____ Period: _____

Show What You Know 4.02

Marc purchased tickets to ride roller coasters at a carnival. The graph shows the relationship between the number of tickets remaining, y, after x rides.

a Complete the table.

Vertical Intercept (x, y)	Horizontal Intercept (x, y)
(0, 15)	(5, 0)

b What does each point represent in this situation?

Vertical Intercept:

Responses vary. Marc started with 15 tickets.

Horizontal Intercept:

Responses vary. Marc went on 5 rides and then ran out of tickets.

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Show What You Know **Lesson 3**

Name: _____ Date: _____ Period: _____

Show What You Know 4.03

Sahana loads an arcade game card with $50. Every time she plays a game, $3 is subtracted from the amount available on the game card.

Let y represent the amount in dollars on the card after Sahana plays x games.

Which equation represents this situation?

A. $y = 50 + 3x$

B. $y = 3 - 50x$

C. $y = -50x - 3$

D. $y = -3x + 50$

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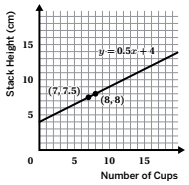
Show What You Know **Lesson 4**

Name: _____ Date: _____ Period: _____

Show What You Know 4.04

Here is a graph that represents a different stack of cups.



a What is the slope of this linear relationship?

0.5

b What does the slope represent in this situation?

Responses vary. The slope represents how much taller the stack becomes with every cup that's added.

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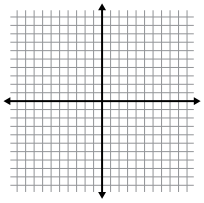
Show What You Know **Lesson 5**

Name: _____ Date: _____ Period: _____

Show What You Know 4.05

Calculate the slope of the line that goes through (1, 3) and (9, 6). Use the graph if it helps with your thinking.

$\frac{3}{8}$ (or equivalent)



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Show What You Know **Lesson 6**

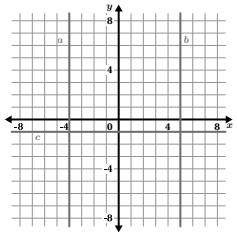
Name: _____ Date: _____ Period: _____

Show What You Know 4.06

Here are three lines on a coordinate plane.

Write an equation for each line.

Line	Equation
a	$x = -4$
b	$x = 5$
c	$y = -1$



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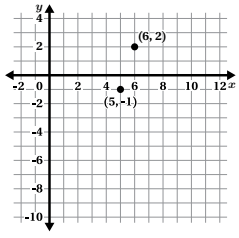
Show What You Know **Lesson 7**

Name: _____ Date: _____ Period: _____

Show What You Know 4.07

Write an equation of a line that goes through (5, -1) and (6, 2).

$y = 3x - 16$



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Show What You Know **Lesson 8**

Name: _____ Date: _____ Period: _____

Show What You Know 4.08

The graph of a linear equation includes the points (-2, 0) and (0, 6).

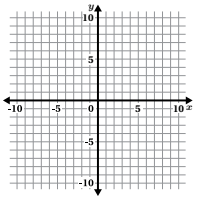
Could $y = 3x + 6$ be an equation for this line?

(Yes) No There is not enough information

Explain your thinking.

Explanations vary.

- The points (-2, 0) and (0, 6) both make the equation $y = 3x + 6$ true.
- The graph of $y = 3x + 6$ goes through both of the points.



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Unit 5
Assessments and Rubrics

Name: ..... Date: ..... Period: .....

Pre-Unit Check

Unit 5

1. Here are Diagrams A and B.

Diagram A

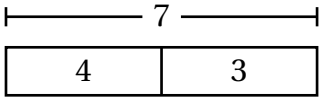
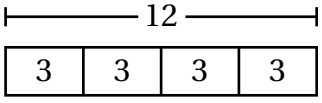


Diagram B



Determine whether each equation matches Diagram A, Diagram B, or neither diagram. Circle your response for each.

a	$7 = 3 + 4$	Diagram A	Diagram B	Neither
b	$4 - 3 = 7$	Diagram A	Diagram B	Neither
c	$4 \cdot 3 = 7$	Diagram A	Diagram B	Neither
d	$3 + 3 + 3 + 3 = 12$	Diagram A	Diagram B	Neither
e	$12 = 4 \cdot 3$	Diagram A	Diagram B	Neither

2. Vihaan collects stickers. He has x stickers. After getting 15 more stickers, he has 60 stickers total.

a How many stickers did Vihaan start with?

b Select *all* the equations that could be used to determine how many stickers Vihaan started with.

- ☐ **A.** $x + 15 = 60$
- ☐ **B.** $x = 60 - 15$
- ☐ **C.** $x = 60 + 15$
- ☐ **D.** $15x = 60$
- ☐ **E.** $x = 60 \cdot 15$

3. Select *all* the equations that are true when x is -4.

- ☐ **A.** $-8 = 2x$
- ☐ **B.** $-12 = x \cdot (-3)$
- ☐ **C.** $-12 = x + x + x$
- ☐ **D.** $\frac{x}{4} = -1$
- ☐ **E.** $x + 4 = -8$

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Pre-Unit Check (continued)

4. Solve each equation.

a $p + 7 = 12$ **b** $90 = -20r$ **c** $\frac{1}{3}s = 7$

5. Which expression is equivalent to $4(x + 2)$?

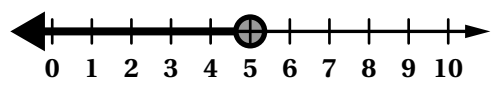
A. $12x$ **B.** $4x + 2$ **C.** $6x$ **D.** $4x + 8$

Explain your thinking.

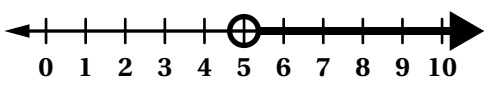
6. Ishaan and Arnav are selling boxes of cookies.

a Ishaan's goal is to sell more than 5 boxes. Which graph shows how many boxes Ishaan must sell in order to reach his goal?

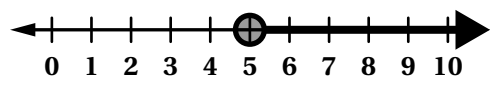
A.



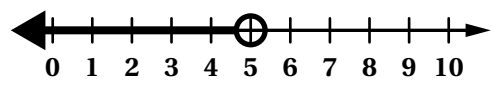
B.



C.



D.



Explain your thinking.

b Arnav sells each box for $\$3.75$. His goal is to make more than $\$30$. How many boxes of cookies could he sell to reach his goal?

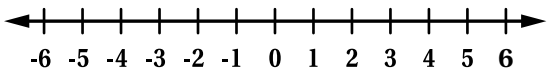
Explain your thinking.

Name: ..... Date: ..... Period: .....

Sub-Unit Quiz

Unit 5

1. Solve $-2(x + 3) \geq -4$ and graph the solution on the number line.



2. Select *all* the equations that have infinitely many solutions.

- ☐ **A.** $7x = 7x$
- ☐ **B.** $10 - 19 + 12x = 4x - 9 + 8x$
- ☐ **C.** $x \cdot 2 \cdot (-6) = x \cdot 3 \cdot 4$
- ☐ **D.** $\frac{1}{2}(6x + 5) = 3x + 2.5$
- ☐ **E.** $x - 6 = 6 - x$

3. Leah-James, Anika, and Sai are each solving the same equation for x. Describe the move they each made.

Original equation:
$12x + 4 = 20x - 12$

a The result of Leah-James's first step was:
$4 = 8x - 12$.

b The result of Anika's first step was:
$3x + 1 = 5x - 3$.

c The result of Sai's first step was:
$12x + 16 = 20x$.

4. Solve each equation.

a $3x + 7 = 40$

b $-2(x + 5) = 10$

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Sub-Unit Quiz (continued)

5. Imani and Esteban each have different audiobook club memberships:

- Imani's book club costs *$10* for the membership and then *$5* per book.
- Esteban's book club costs *$16* for the membership and then *$2* per book.

a After listening to 4 audiobooks, whose book club costs more? Circle one.

Imani's Esteban's They cost the same amount

Explain your thinking.

b After how many audiobooks will both book clubs cost the same total amount?

5. Solve each equation. Show or explain your thinking.

a $1d + 12 = 14 - 2d$

b $\frac{1}{2}(8r + 24) = 10r$

c $-2(5 + x) - 1 = 3(x + 3)$

Standard	MA.7.AR.2.2	MA.8.AR.2.1	MA.8.AR.2.2	MA.8.AR.3.5
Problem(s)	4	2, 3, 5b, 6	1	5a

Problem 1

Standard: MA.8.AR.2.2

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $x \leq -1$ Graph shows a closed circle at -1 with a ray pointing to the left.	Response shows **conceptual understanding** with minor errors. E.g., Solution is $x \geq -1$. Graph shows a closed circle at -1 with a ray pointing to the right.	Response shows **incomplete understanding** with significant errors. E.g., Solution is $x = -1$. Graph shows a closed circle at -1.	**Response shows** limited understanding.

Problem 2

Standard: MA.8.AR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
All correct choices and **no incorrect** choices. • $7x = 7x$ • $10 - 19 + 12x = 4x - 9 + 8x$ • $\frac{1}{2}(6x + 5) = 3x + 2.5$	**One or two correct** choices and **no incorrect** choices. **All correct** choices and **one incorrect** choice.	**One or two correct** choices and **one incorrect** choice.	**Only incorrect** choices. **Two or more incorrect** choices with some correct choices.

Problem 3a

Standards: MA.8.AR.2.1, MTR.4.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: *Responses vary.* Liam subtracted $12x$ from each side.	Response shows **conceptual understanding** with minor errors. E.g., Response includes "Subtracted 12 from each side."	Response shows **incomplete understanding** with significant errors. E.g., Response includes "Liam combined the $12x$ and $20x$." E.g., Response includes "Liam got rid of the $12x$."	Response shows **limited understanding**.

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Problem 3b			**Standards:** MA.8.AR.2.1, MTR.4.1
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response: *Responses vary.* Anika divided each term in the equation by 4.	Response shows **conceptual understanding** with minor errors. E.g., Response Includes "Anika divided each term in the equation by $\frac{1}{4}$."	Response shows **incomplete understanding** with significant errors. E.g., Response includes "Anika wrote the equation with smaller numbers."	Response shows **limited understanding**.

Problem 3c			**Standards:** MA.8.AR.2.1, MTR.4.1
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response: *Responses vary.* Sai added 12 to each side.	Response shows **conceptual understanding** with minor errors. E.g., Response includes "Sai added 12 and 4."	Response shows **incomplete understanding** with significant errors. E.g., Response includes "Sai combined the 4 and the 12." E.g., Response includes "Sai got rid of the 12."	Response shows **limited understanding**.

Problem 4a			**Standard:** MA.7.AR.2.2
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response: $x = 11$	Response shows **conceptual understanding** with minor errors. E.g., Response includes a sign error, such as writing $x = -11$.	Response shows **incomplete understanding** with significant errors. Students who write $x = \frac{47}{3}$ may have added 7 to balance both sides of the equation, then divided by 3.	Response shows **limited understanding**.

Problem 4b			**Standard:** MA.7.AR.2.2
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response: $x = -10$	Response shows **conceptual understanding** with minor errors. E.g., Response includes a sign error, such as writing $x = 10$.	Response shows **incomplete understanding** with significant errors. Students who write $x = 7$ may have added 2 to balance both sides of the equation, then subtracted by 5.	Response shows **limited understanding**.

Problem 5a			**Standards:** MA.8.AR.3.3, MTR.6.1
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response and **complete** explanation. Imani's. *Explanations vary.* After 4 books, Imani's book club total is $30 and Esteban's total is $24.	**Correct** response with **minor flaws** in explanation. E.g., Response includes minor arithmetic errors in calculating Imani's and/or Esteban's costs. **Incorrect** response with logical and **complete explanation**. E.g., Response includes "Esteban's book club. After 4 books, Imani's book club total is $30 and Esteban's total is $24."	**Correct** response with **incomplete** explanation. E.g., Response includes "Imani's book club. Imani's book club costs more." **Incorrect** response with explanation that shows **partial understanding**.	**Incorrect** response with **no** explanation.

Problem 5b			**Standards:** MA.8.AR.2.1, MTR.6.1
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response: 2 audiobooks	Response shows **conceptual understanding** with minor errors. Students who write 20 may have determined the amount when both book clubs cost the same price.	Response shows **incomplete understanding** with significant errors. E.g., Response includes "They will never cost the same amount because they are different prices."	Response shows **limited understanding**.

Problem 6a

Standard: MA.8.AR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. $d = \frac{2}{3}$ **(or equivalent).** ***Work varies.*** $1d + 12 = 14 - 2d$ $1d = 2 - 2d$ $3d = 2$ $d = \frac{2}{3}$	Response shows **conceptual understanding** with minor errors. Students who write $d = \frac{3}{2}$ may have made an error solving $3d = 2$ for d.	Response shows **incomplete understanding** with significant errors. Students who write -26 may have added like terms on each side of the equation.	Response shows **limited understanding**.

Problem 6b

Standard: MA.8.AR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. $r = 2$. ***Work varies.*** $\frac{1}{2}(8r + 24) = 10r$ $8r + 24 = 20r$ $24 = 12r$ $2 = r$	Response shows **conceptual understanding** with minor errors.	Response shows **incomplete understanding** with significant errors. Students who write $r = 4$ may have only distributed the $\frac{1}{2}$ to the first term in the parentheses.	Response shows **limited understanding**.

Problem 6c

Standard: MA.8.AR.2.1

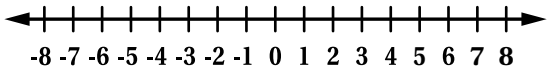
4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. $x = -4$. ***Work varies.*** $-2(5 + x) - 1 = 3(x + 3)$ $-10 - 2x - 1 = 3x + 9$ $-11 - 2x = 3x + 9$ $-2x = 3x + 20$ $-5x = 20$ $x = -4$	Response shows **conceptual understanding** with minor errors. Students who write $x = 4$ may have solved the equation correctly, but forgot the negative.	Response shows **incomplete understanding** with significant errors. Students who write $x = -\frac{17}{5}$ may have distributed the -2 to all of the terms on the left side of the equation.	Response shows **limited understanding**.

Name: ..... Date: ..... Period: .....

End-of-Unit Assessment

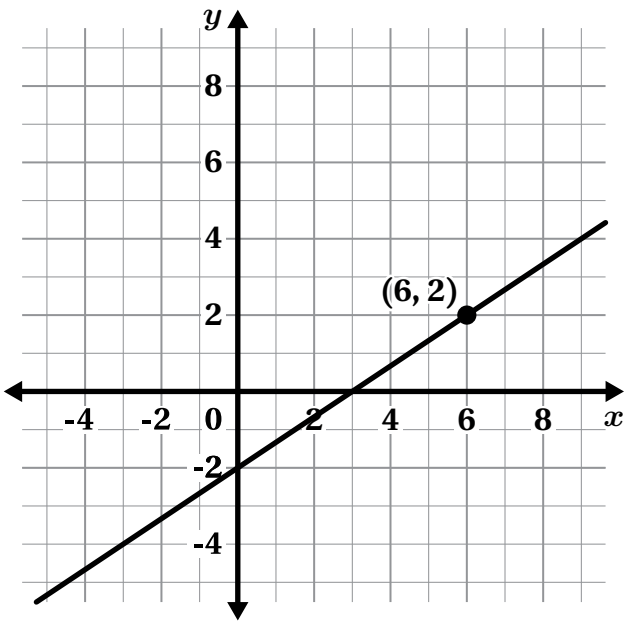
Unit 5

1. Solve $4(3 - x) < -4$ and graph the solution on the number line.



2. A system of two equations has the solution $(6, 2)$. Here is a graph of one of the equations.

What could the other equation be?



A. $y = 4x - 2$

B. $y = \frac{2}{3}x - 1$

C. $y = \frac{1}{2}x - 1$

D. $y = -\frac{3}{2}x + 6$

3. Which system of equations has exactly one solution?

A. $y = 3x + 1$
$y = -3x + 7$

B. $y = 3x + 1$
$y = 3x + 7$

C. $y = x + 10$
$y = x + 10$

D. $y = -x + 10$
$y = -x + 12$

Explain your thinking.

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End-of-Unit Assessment (continued)

Unit 5

4. Identify the number of solutions for each equation. If it has one solution, write the solution.

a $2x - 4 = 5 - 3x$

b $12x + 9 - 4x + 3 = 17 + 8x - 5$

c $\frac{1}{2}(8x - 14) = 3(x - 4)$

5. Solve this system of equations. Write the solution as an ordered pair (x, y).

$y = -3x + 18$
$y = 7x - 2$

6. Ari and Kiri are each saving money.

- Ari starts with $100 in savings and saves $5 each week.
- Kiri starts with $40 in savings and saves $10 each week.

a After 4 weeks, who has more money in savings? Circle one.

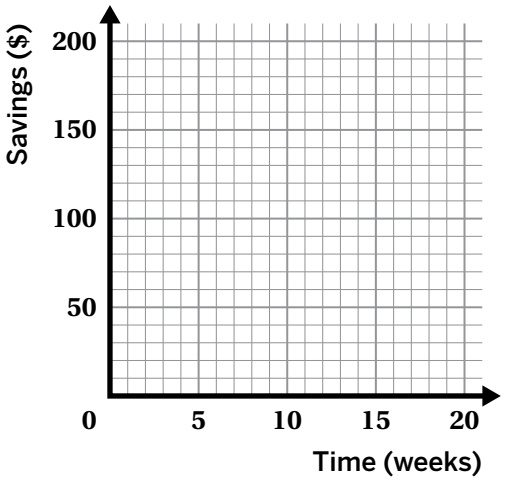
Ari Kiri They saved the same amount

Explain your thinking.

b After how many weeks will Ari and Kiri have the same amount of money in savings?

Show or explain your thinking.

Use the graph if it helps with your thinking.



7. Taylor is making jam. Her recipe calls for 3 strawberries for each apple.

a Complete the table so that each row matches Taylor's recipe.

Strawberries (lb), x	Apples (lb), y
	10
5	
	0
6	

b Taylor used 52 pieces of fruit altogether. She wrote two equations to represent the situation, where x is the number of apples and y is the number of strawberries:

$y = 3x$
$52 = x + y$

How many apples and strawberries did Taylor use?

Show or explain your thinking.

Standard	MA.8.AR.2.1	MA.8.AR.2.2	MA.8.AR.3.3	MA.8.AR.4.1	MA.8.AR.4.2	MA.8.AR.4.3
Problem(s)	4	1	6	2	3	5, 7

Problem 1

Standard: MA.8.AR.2.2

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $x > 4$ Graph shows an open circle at 4 with a ray pointing to the right.	Response shows **conceptual understanding** with minor errors. E.g., Solution is $x < 4$. Graph shows an open circle at 4 with a ray pointing to the left.	Response shows **incomplete understanding** with significant errors. E.g., Solution is $x = 4$. Graph shows an open circle at 4.	Response shows **limited understanding.**

Problem 2

Standards: MA.8.AR.4.1, MTR.5.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: $y = \frac{1}{2}x - 1$			**Incorrect** choice. Students who select $y = -\frac{3}{2}x + 6$ may have drawn the line, but used a slope of $-\frac{2}{3}$. Students who select $y = 4x - 2$ may have noticed that the point $(2, 6)$ is on the line.

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Problem 3

Standard: MA.8.AR.4.2

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice and **complete** explanation. $y = 3x + 1$ $y = -3x + 7$ *Explanations vary.* Each line in this system of equations has a different slope, so I know they are not parallel and they are not the same line. They would intersect at exactly one point.	**Correct** response with **minor flaws** in explanation. E.g., Response includes either explanation of why the lines are not parallel or not the same line but not both. **Incorrect** response with logical and **complete explanation**.	**Correct** response with **incomplete** explanation. E.g., Response includes "because the equations are different." **Incorrect** response with explanation that shows **partial understanding**. E.g., Response includes "each line has a different slope, so I know they are not parallel and not the same line", but the slopes are equivalent when converted to slope-intercept form.	**Incorrect** response with **no** explanation.

Problem 4a

Standard: MA.8.AR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: One solution: $x = \frac{9}{5}$ (or equivalent)	Response shows **conceptual understanding** with minor errors.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding**.

Problem 4b

Standard: MA.8.AR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: Infinitely many solutions	Response shows **conceptual understanding** with minor errors.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding**.

Problem 4c			**Standard:** MA.8.AR.2.1
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response: **One solution: $x = -5$**	Response shows **conceptual understanding** with minor errors. Students who write $x = 5$ may have solved the equation correctly, but forgot the negative.	Response shows **incomplete understanding** with significant errors. Students who write $x = -18$ may have only distributed the coefficients to the first term in each parentheses.	Response shows **limited understanding**.

Problem 5			**Standard:** MA.8.AR.4.3
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response: **$(2, 12)$**	Response shows **conceptual understanding** with minor errors. Students who write $(2, 24)$ may have correctly solved for the value of x but then did not consider the negative when substituting into $y = -3x + 8$.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding**.

Problem 6a

Standard: MA.8.AR.3.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. **Ari. *Explanations vary.* Ari has \$120 because $120 = 100 + 4 \cdot 5$. Kiri has \$80 because $80 = 40 + 4 \cdot 10$.**	**Correct** response with **minor flaws** in explanation. E.g., Response includes minor arithmetic errors. **Incorrect** response with logical and **complete explanation**. E.g., Students who select *Kiri* but correctly calculate Ari and Kiri's savings.	**Correct** response with **incomplete** explanation. E.g., Response includes "Ari saves more." **Incorrect** response with explanation that shows **partial understanding**.	**Incorrect** response with **no** explanation.

Problem 6b

Standard: MA.8.AR.3.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. **12 weeks. *Explanations vary.* The solution to the equation $100 + 5n = 40 + 10n$ represents after how many weeks the amount of money in each account will be the same. The solution to this equation is $n = 12$.**	Response shows **conceptual understanding** with minor errors.	Response shows **incomplete understanding** with significant errors. Students who write "6 weeks" may have determined how many weeks until Kiri has \$100.	Response shows **limited understanding**.

Problem 7a

Standard: MA.8.AR.4.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct responses: • $(1, 3)$ • $(8, 24)$ • $(5, 15)$ • $(3, 9)$	Response shows **conceptual understanding** with minor errors. **Three correct** responses.	Response shows **incomplete understanding** with significant errors. **Two correct** responses.	Response shows **limited understanding**. Students who write 11 strawberries for 8 apples may have used addition instead of multiplication. **One correct** response.

Problem 7b

Standard: MA.8.AR.4.3

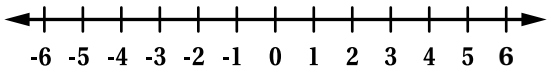
4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. **4 pounds of strawberries, 8 pounds of apples. *Explanations vary.* Solving the system of equations using substitution means $48 = 6x + 3(2x)$. Then $48 = 4x + 6x$, so $4 = x$. Substituting $4 = x$ into $y = 2x$, I found that $y = 8$.**	**Correct** response with **minor flaws** in explanation. **Incorrect** response with logical and **complete explanation**. E.g., Response includes minor arithmetic errors.	**Correct** response with **incomplete** explanation. **Incorrect** response with explanation that shows **partial understanding**. E.g., Response includes some correct solving steps, such as substituting $y = 2x$ into the other equation.	**Incorrect** response with **no** explanation.

Name: ..... Date: ..... Period: .....

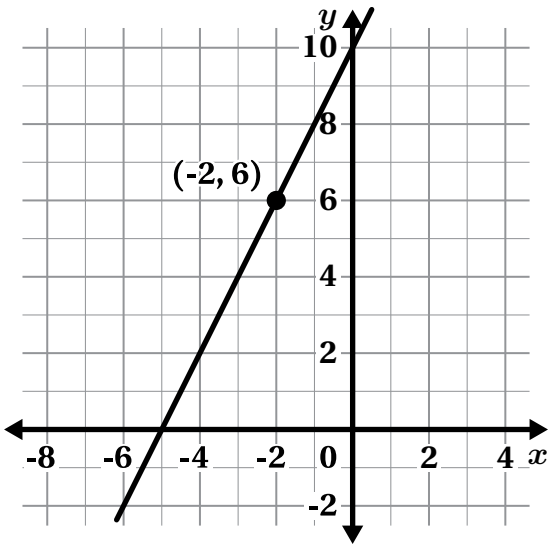
End-of-Unit Assessment

Unit 5

1. Solve $-3(x + 2) \geq -12$ and graph the solution on the number line.



2. A system of two equations has the solution (-2, 6). Here is a graph of one of the equations.



What could the other equation be?

A. $y = 3x - 6$

B. $y = x + 8$

C. $y = 2x - 10$

D. $y = -2x + 6$

3. Which system of equations has exactly one solution?

A. $y = -x + 3$
$y = -x + 9$

B. $y = -2x + 3$
$y = 2x + 9$

C. $y = -2x + 3$
$y = -2x + 9$

D. $y = x + 3$
$y = x + 3$

Explain your thinking.

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End-of-Unit Assessment (continued)

4. Identify the number of solutions for each equation. If it has one solution, write the solution.

a $-3x - 4 = x + 3$

b $3x + 30 + x = 10 - x + 5x + 2$

c $3(x + 4) = \frac{1}{3}(6 + 12x)$

5. Solve this system of equations. Write the solution as an ordered pair (x, y).

$y = 5x - 6$
$y = -3x + 18$

6. Aba just got a puppy and a kitten. She found out how much they will grow over the next year.

- The puppy weighs about 25 ounces and will gain about 5 ounces each month.
- The kitten weighs about 10 ounces and will gain about 10 ounces each month.

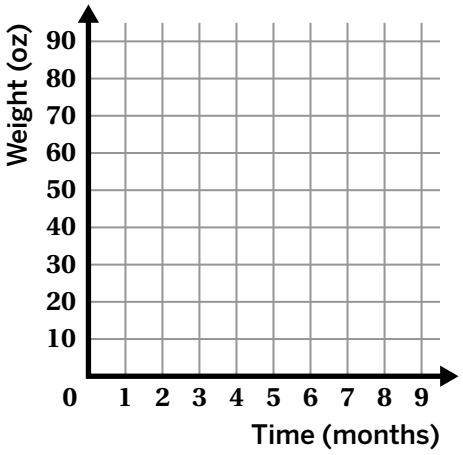
a After 2 months, which pet will weigh more? Circle one.

The puppy The kitten They will weigh the same amount

Explain your thinking.

b After how many months will the puppy and the kitten weigh the same amount? Show or explain your thinking.

Use the graph if it helps with your thinking.



7. Theo and Chey have $48 to spend on apples and strawberries to make jam. Apples cost $4 per pound and strawberries cost $6 per pound.

a Complete the table so that each row costs $48.

Pounds of Apples, x	Pounds of Strawberries, y
	2
6	
	8
12	

b Theo and Chey bought twice as many pounds of strawberries than pounds of apples. They wrote two equations, where x is pounds of apples and y is pounds of strawberries:

$48 = 4x + 6y$
$y = 2x$

How many pounds of each fruit did they buy?

Show or explain your thinking.

Standard	MA.8.AR.2.1	MA.8.AR.2.2	MA.8.AR.3.3	MA.8.AR.4.1	MA.8.AR.4.2	MA.8.AR.4.3
Problem(s)	4	1	6	2	3	5, 7

Problem 1

Standard: MA.8.AR.2.2

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $x \leq 2$ Graph shows a closed circle at 2 with a ray pointing to the left.	Response shows **conceptual understanding** with minor errors. E.g., Solution is $x \geq 2$. Graph shows a closed circle at 2 with a ray pointing to the right.	Response shows **incomplete understanding** with significant errors. E.g., Solution is $x = 2$. Graph shows a closed circle at 2.	Response shows **limited understanding.**

Problem 2

Standards: MA.8.AR.4.1, MTR.5.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: $y = x + 8$			**Incorrect** choice. Students who select $y = -2x + 6$ may have noticed that the equation contains the values -2 and 6. Students who select $y = 2x - 10$ may have thought they could add -4 and 10.

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Problem 3

Standard: MA.8.AR.4.2

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. $y = -2x + 3$ $y = 2x + 9$ ***Explanations vary.*** **Each line in this system of equations has a different slope, so I know they are not parallel and they are not the same line. They would intersect at exactly one point.**	**Correct** response with **minor flaws** in explanation. E.g., Response includes either explanation of why the lines are not parallel or not the same line but not both. **Incorrect** response with logical and **complete explanation**.	**Correct** response with **incomplete** explanation. E.g., Response includes "because the equations are different." **Incorrect** response with explanation that shows **partial understanding**. E.g., Response includes "each line has a different slope, so I know they are not parallel and not the same line", but the slopes are equivalent when converted to slope-intercept form.	**Incorrect** response with **no** explanation.

Problem 4a

Standard: MA.8.AR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: **One solution:** $x = -\frac{7}{4}$ **(or equivalent)**	Response shows **conceptual understanding** with minor errors.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding**.

Problem 4b

Standard: MA.8.AR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: **No solution**	Response shows **conceptual understanding** with minor errors.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding**.

Problem 4c			**Standard:** MA.8.AR.2.1
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response: **One solution: $x = 10$**	Response shows **conceptual understanding** with minor errors.	Response shows **incomplete understanding** with significant errors. Students who write $x = 2$ may have distributed correctly but solved the equation by adding the like terms, and then solved $7x = 14$.	Response shows **limited understanding**.

Problem 5			**Standard:** MA.8.AR.4.3
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response: **$(3, 9)$**	Response shows **conceptual understanding** with minor errors. Students who write $(3, 27)$ may have correctly solved for the value of x but then did not consider the negative when substituting into $y = -3x + 18$.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding**.

Problem 6a

Standard: MA.8.AR.3.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. **The puppy. *Explanations vary.* The puppy would weigh 35 ounces because $25 + 5 \cdot 2 = 35$. The kitten would weigh 30 ounces because $10 + 10 \cdot 2 = 30$.**	**Correct** response with **minor flaws** in explanation. E.g., Response includes minor arithmetic errors. **Incorrect** response with logical and **complete explanation**. E.g., Students who select *The kitten* but correctly calculate the growth of the puppy and the kitten.	**Correct** response with **incomplete** explanation. E.g., Response includes "The puppy weighs more." **Incorrect** response with explanation that shows **partial understanding**.	**Incorrect** response with **no** explanation.

Problem 6b

Standard: MA.8.AR.3.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. **3 months. *Explanations vary.* The solution to the equation $25 + 5m = 10 + 10m$ represents after how many months the weights will be the same. The solution to this equation is $m = 3$.**	Response shows **conceptual understanding** with minor errors.	Response shows **incomplete understanding** with significant errors. Students who write "1.5 months" may have determined how many weeks until the kitten weighs 25 ounces.	Response shows **limited understanding**.

Problem 7a			**Standard:** MA.8.AR.4.3
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct responses: • $(9, 2)$ • $(6, 4)$ • $(0, 8)$ • $(12, 0)$	Response shows **conceptual understanding** with minor errors. **Three correct** responses.	Response shows **incomplete understanding** with significant errors. **Two correct** responses.	Response shows **limited understanding**. Responses whose rows sum to 48 may not have considered the price per pound for each fruit. **One correct** response.

Problem 7b			**Standard:** MA.8.AR.4.3
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response and **complete** explanation. 3 pounds of apples and 6 pounds of strawberries. *Explanations vary.* Solving the system of equations using substitution means $48 = 4x + 6(2x)$. Then $48 = 4x + 12x$, so $3 = x$. Substituting $3 = x$ into $y = 2x$, I found that $y = 6$.	**Correct** response with **minor flaws** in explanation. **Incorrect** response with logical and **complete explanation**. E.g., Response includes minor arithmetic errors.	**Correct** response with **incomplete** explanation. **Incorrect** response with explanation that shows **partial understanding**. E.g., Response includes some correct solving steps, such as substituting $y = 2x$ into the other equation.	**Incorrect** response with **no** explanation.

Unit 5
Show What You Know PDFs

Name: Date: Period:

Show What You Know

5.01

What is the value of x in the equation $5x + \frac{1}{4} = \frac{61}{4}$?

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Name: Date: Period:

Show What You Know

5.02

Solve each equation. Show your thinking.

a $-3x - 5 = 16$

b $12 = -4(x - 2)$

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Name: Date: Period:

Show What You Know

5.03

Solve the equation. Show your thinking.

$8.88 = 4.44(x - 7)$

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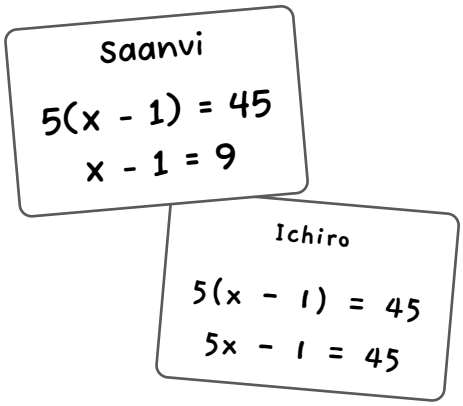
Show What You Know

5.04

Saanvi and Ichiro each started solving the equation $5(x - 1) = 45$.



a One of them made an error. Who was it?

b What was the error?

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Name: Date: Period:

Show What You Know

5.05

Neo is hiking in a canyon. At one point during the hike, Neo is at an elevation of 453 feet. After descending at a rate of 50 feet per minute, he reaches an elevation of 146 feet.

a Write and solve an equation to represent this situation.

b How much time does Neo descent take?

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Name: Date: Period:

Show What You Know

5.06

Melanie and Kala each started solving the equation $\frac{1}{2}(7x - 6) = 6x - 10$.

Melanie	Kala
$\frac{1}{2}(7x - 6) = 6x - 10$	$\frac{1}{2}(7x - 6) = 6x - 10$
$3.5x - 6 = 6x - 10$	$7x - 6 = 12x - 20$

Whose move kept the equation balanced? Circle one.

Melanie's Kala's Both Neither

Explain your thinking.

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Name: Date: Period:

Show What You Know

5.07

Sort each equation based on whether it has no solution, one solution, or infinitely many solutions.

$6x + 8 = 7x + 13$ $6x + 8 = 2(3x + 4)$ $6x + 8 = 6x + 13$

No Solution	One Solution	Infinitely Many Solutions

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Name: Date: Period:

Show What You Know

5.08

Solve each equation. Show your thinking.

a $3x - 5 = \frac{1}{2}x$

b $-5(x - 1) + x = 2x - 3$

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Name: Date: Period:

Show What You Know

5.09

Andrea is comparing the costs of printing p pages at home and at a store.

She writes the equation $100 + 0.05p = 0.25p$ based on this information:

- A home printer costs $\$100$ plus an additional $\$0.05$ per page for the ink.
- To print pages at a store, it costs $\$0.25$ per page.

The solution to Andrea's equation is $p = 500$. What does that represent in this situation?

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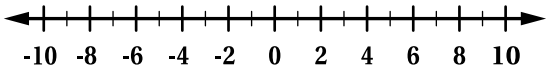
Name: Date: Period:

Show What You Know

5.10

Solve the inequality $-\frac{1}{2}(x-2) \leq 3$ and graph the solution. Show your work.



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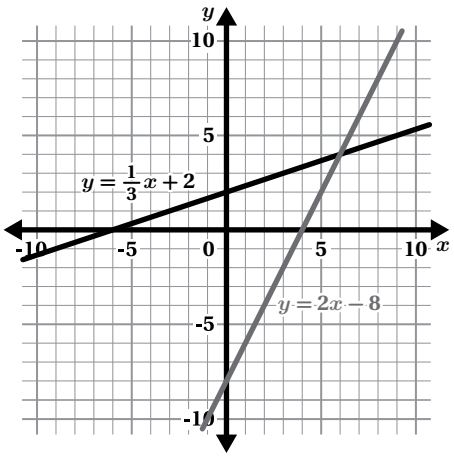
Name: Date: Period:

Show What You Know

5.11

This graph represents two relationships.



a What is a combination of values that makes both relationships true?

x-value	y-value

b What is a combination of values that makes one relationship true but not the other?

x-value	y-value

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Name: Date: Period:

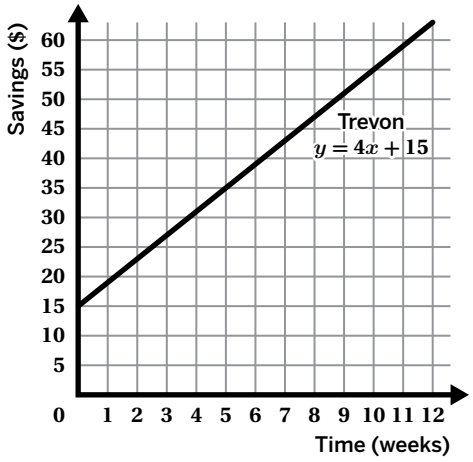
Show What You Know

5.12

Amanda and Trevon started tracking their savings at the same time.

- Trevon started with $\$15$ and saves $\$4$ per week.
- Amanda started with $\$10$ and saves $\$5$ per week.

Here is the graph of Trevon's savings.



a Graph a line to represent Amanda's savings.

b Explain what the intersection point of the lines means in this situation.

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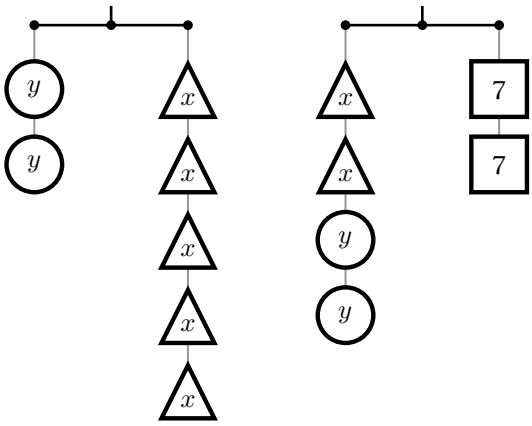
Name: Date: Period:

Show What You Know

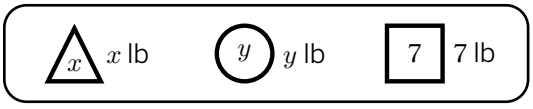
5.13

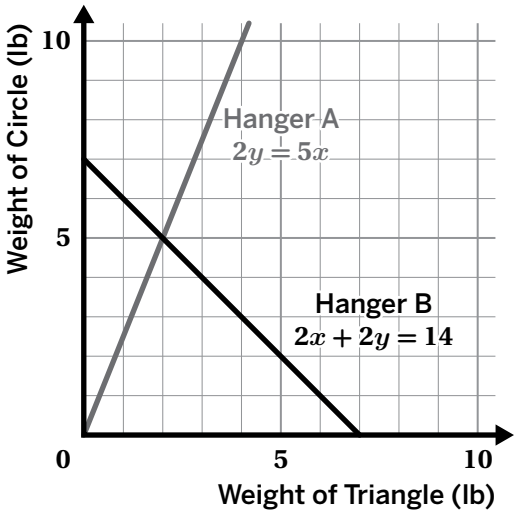
Determine the solution to this system of equations: $2y = 5x$, $2x + 2y = 14$



Hanger A
$2y = 5x$

Hanger B
$2x + 2y = 14$





Explain your thinking.

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Name: Date: Period:

Show What You Know

5.14

What is the solution to this system of equations?

$y = 2x$
$y = 3x - 10$

Write your solution as an ordered pair.

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Name: Date: Period:

Show What You Know

5.15

How many solutions will this system of equations have?

$y = 3x + 5$
$y = 3x - 5$

No solution One solution Infinitely many solutions

Explain your thinking.

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Show What You Know **Lesson 1**

Name: _____ Date: _____ Period: _____

Show What You Know 5.01

What is the value of x in the equation $5x + \frac{1}{4} = \frac{61}{4}$?

$x = 3$

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Show What You Know **Lesson 2**

Name: _____ Date: _____ Period: _____

Show What You Know 5.02

Solve each equation. Show your thinking.

a. $-3x - 5 = 16$

$x = -7$

Work varies.

$-3x - 5 + 5 = 16 + 5$

$-3x = 21$

$-3x \div -3 = 21 \div -3$

$x = -7$

b. $12 = -4(x - 2)$

$x = -1$

Work varies.

$\frac{12}{-4} = \frac{-4}{-4}(x - 2)$

$-3 = x - 2$

$-3 + 2 = x - 2 + 2$

$-1 = x$

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Show What You Know **Lesson 3**

Name: _____ Date: _____ Period: _____

Show What You Know 5.03

Solve the equation. Show your thinking.

$8.88 = 4.44(x - 7)$

$x = 9$

Work varies.

$2 = x - 7$

$2 + 7 = x - 7 + 7$

$9 = x$

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Show What You Know **Lesson 4**

Name: _____ Date: _____ Period: _____

Show What You Know 5.04

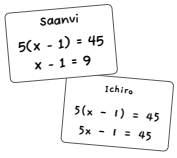
Saanvi and Ichiro each started solving the equation $5(x - 1) = 45$.

a. One of them made an error. Who was it?

Ichiro

b. What was the error?

Ichiro didn't expand correctly. He only multiplied 5 to the first term in the parentheses.



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Show What You Know **Lesson 5**

Name: _____ Date: _____ Period: _____

Show What You Know 5.05

Neo is hiking in a canyon. At one point during the hike, Neo is at an elevation of 453 feet. After descending at a rate of 50 feet per minute, he reaches an elevation of 146 feet.

a. Write and solve an equation to represent this situation.

$453 - 50x = 146$

$-50x = -307$

$x = 6.14$

b. How much time does Neo descent take?

6.14 minutes

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Show What You Know **Lesson 6**

Name: _____ Date: _____ Period: _____

Show What You Know 5.06

Melanie and Kala each started solving the equation $\frac{1}{2}(7x - 6) = 6x - 10$.

Melanie

$\frac{1}{2}(7x - 6) = 6x - 10$

$3.5x - 6 = 6x - 10$

Kala

$\frac{1}{2}(7x - 6) = 6x - 10$

$7x - 6 = 12x - 20$

Whose move kept the equation balanced? Circle one.

Melanie's (Kala's) Both Neither

Explain your thinking.

Explanations vary. Kala's move kept the equation balanced because she multiplied both sides of the equation by 2. Melanie's move unbalanced the equation because she only distributed the $\frac{1}{2}$ to the first term in the parentheses instead of to both terms.

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Show What You Know **Lesson 7**

Name: _____ Date: _____ Period: _____

Show What You Know 5.07

Sort each equation based on whether it has no solution, one solution, or infinitely many solutions.

$6x + 8 = 7x + 13$ $6x + 8 = 2(3x + 4)$ $6x + 8 = 6x + 13$

No Solution	One Solution	Infinitely Many Solutions
$6x + 8 = 6x + 13$	$6x + 8 = 7x + 13$	$6x + 8 = 2(3x + 4)$

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Show What You Know **Lesson 8**

Name: _____ Date: _____ Period: _____

Show What You Know 5.08

Solve each equation. Show your thinking.

a. $3x - 5 = \frac{1}{2}x$

$x = 2$. *Work varies.*

$3x - 5 = \frac{1}{2}x$

$2.5x - 5 = 0$

$2.5x = 5$

$x = 2$

b. $-5(x - 1) + x = 2x - 3$

$x = \frac{4}{3}$ (or equivalent). *Work varies.*

$-5(x - 1) + x = 2x - 3$

$-5x + 5 + x = 2x - 3$

$-4x + 5 = 2x - 3$

$5 = 6x - 3$

$8 = 6x$

$\frac{8}{6} = x$

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Show What You Know **Lesson 9**

Name: _____ Date: _____ Period: _____

Show What You Know 5.09

Andrea is comparing the costs of printing p pages at home and at a store.

She writes the equation $100 + 0.05p = 0.25p$ based on this information:

- A home printer costs $100 plus an additional $0.05 per page for the ink.
- To print pages at a store, it costs $0.25 per page.

The solution to Andrea's equation is $p = 500$. What does that represent in this situation?

Responses vary. The solution represents the number of pages for when the cost will be the same for printing at the store and at home.

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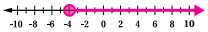
Show What You Know **Lesson 10**

Name: _____ Date: _____ Period: _____

Show What You Know 5.10

Solve the inequality $\frac{1}{2}(x - 2) \leq 3$ and graph the solution. Show your work.



Solution: $x \geq -4$.

Work varies.

$$-\frac{1}{2}(x - 2) \leq 3$$
$$-\frac{1}{2}x + 1 \leq 3$$
$$-\frac{1}{2}x \leq 2$$
$$x \geq -4$$

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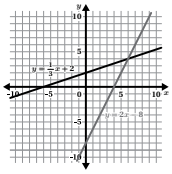
Show What You Know **Lesson 11**

Name: _____ Date: _____ Period: _____

Show What You Know 5.11

This graph represents two relationships.



a. What is a combination of values that makes both relationships true?

x-value	y-value
6	4

b. What is a combination of values that makes one relationship true but not the other?

Responses vary.

x-value	y-value
0	-8

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Show What You Know **Lesson 12**

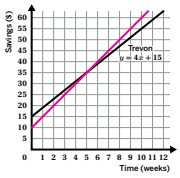
Name: _____ Date: _____ Period: _____

Show What You Know 5.12

Amanda and Trevon started tracking their savings at the same time.

- Trevon started with $15 and saves $4 per week.
- Amanda started with $10 and saves $5 per week.

Here is the graph of Trevon's savings.



a. Graph a line to represent Amanda's savings.

b. Explain what the intersection point of the lines means in this situation.

Responses vary. In this situation, the intersection at (5, 35) means that after 5 weeks, Trevon and Amanda each have $35.

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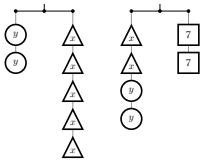
Show What You Know **Lesson 13**

Name: _____ Date: _____ Period: _____

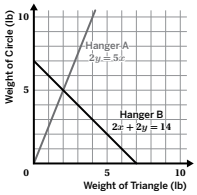
Show What You Know 5.13

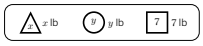
Determine the solution to this system of equations: $2y = 5x$, $2x + 2y = 14$



Hanger A
$2y = 5x$

Hanger B
$2x + 2y = 14$





(2, 5)

Explain your thinking.

Explanations vary. The solution (2, 5) means that when the weight of the triangle is 2 and the weight of the circle is 5, both hangers will be balanced. This makes sense because substituting in those values makes each side of Hanger A weigh 10 pounds and each side of Hanger B weigh 14 pounds.

Accelerated 7 227

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Show What You Know **Lesson 14**

Name: _____ Date: _____ Period: _____

Show What You Know 5.14

What is the solution to this system of equations?

$y = 2x$
$y = 3x - 10$

Write your solution as an ordered pair.

(10, 20). *Work varies.*

$2x = 3x - 10$
$-x = -10$
$x = 10$
$y = 2(10)$
$y = 20$

Accelerated 7 228

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Show What You Know **Lesson 15**

Name: _____ Date: _____ Period: _____

Show What You Know 5.15

How many solutions will this system of equations have?

$y = 3x + 5$
$y = 3x - 5$

No solution (circled) One solution Infinitely many solutions

Explain your thinking.

Explanations vary. The graphs of these equations will have the same slope but different y-intercepts. This means the lines will never meet.

Accelerated 7 229

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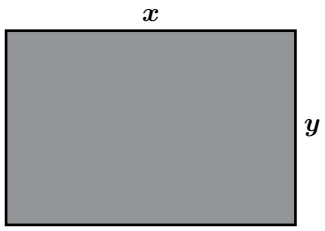
Unit 6
Assessments and Rubrics

Name: ..... Date: ..... Period: .....

Pre-Unit Check

Unit 6

1. A rectangle has length x and width y.



Select *all* the statements that must be true.

- ☐ **A.** The perimeter is $x + y$.
- ☐ **B.** The perimeter is xy.
- ☐ **C.** The perimeter is $2(x + y)$.
- ☐ **D.** The perimeter is $2xy$.
- ☐ **E.** The perimeter is $2x + 2y$.
- ☐ **F.** The area is $x + y$.
- ☐ **G.** The area is xy.
- ☐ **H.** The area is $2xy$.

2. Juana is three years older than twice her brother's age.

Select *all* the equations that represent the relationship between Juana's age, j, and her brother's age, b.

- ☐ **A.** $j = 2b + 3$
- ☐ **B.** $j = 2(b + 3)$
- ☐ **C.** $j = \frac{b}{2} - 3$
- ☐ **D.** $b = 2j + 3$
- ☐ **E.** $b = \frac{j - 3}{2}$
- ☐ **F.** $b = \frac{j}{2} - 3$

3. Here is an equation: $y = -3x + 2.5$

a When x is 1, what value of y makes the equation true?

b When x is -1.5, what value of y makes the equation true?

c When y is 8.5, what value of x makes the equation true?

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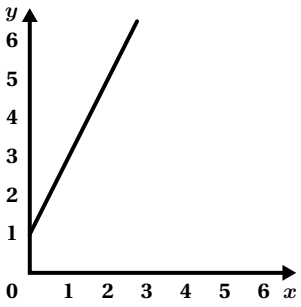
Pre-Unit Check (continued)

Unit 6

4. Select *all* the linear relationships.

☐ **A.**



☐ **B.** A train is traveling at a constant speed of 60 miles per hour. The number of hours the train has been traveling is t. The number of miles the train has traveled is d.

☐ **C.**

x	y
3	6
4	12
5	24

☐ **D.** $y = 3x$, where x and y are both positive numbers.

☐ **E.** $y = \frac{1}{x}$

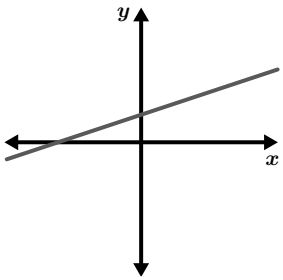
Name: ..... Date: ..... Period: .....

Sub-Unit Quiz

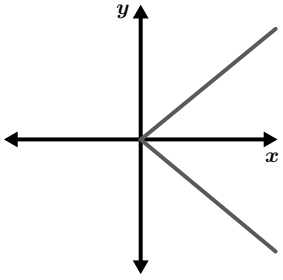
Unit 6

1. Select *all* the graphs that represent y as a function of x.

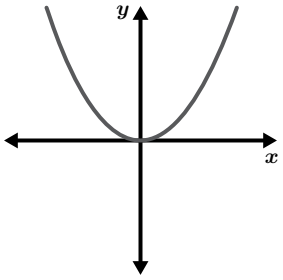
☐ **A.**



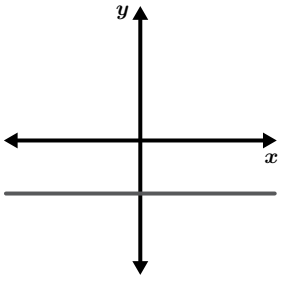
☐ **B.**



☐ **C.**



☐ **D.**



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2. Jaleel wrote a book and wants to print some copies for friends and family. The printing company charges a one-time fee of $\$200$, plus $\$2$ for each printed book.

a Is Jaleel's total cost a function of the number of printed books? Explain your thinking.

b Is the number of printed books a function of the total cost? Explain your thinking.

c The equation $c = 200 + 2b$ represents the total cost, c, if Jaleel prints b books. Identify the independent variable and the dependent variable for this situation.

Independent Variable	Dependent Variable

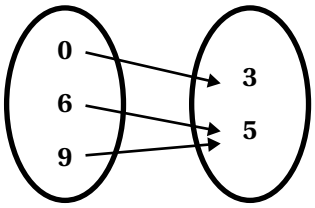
3. What is the domain and range of the relations below?

a $\{(4, 8), (7, 9), (12, 1)\}$

Domain: .....

Range: .....

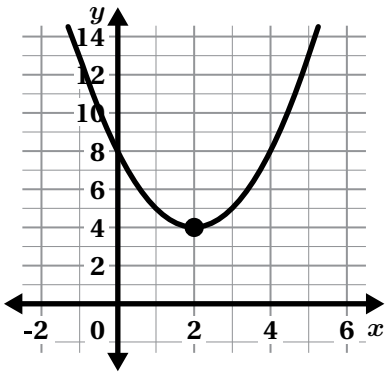
b



Domain: .....

Range: .....

c



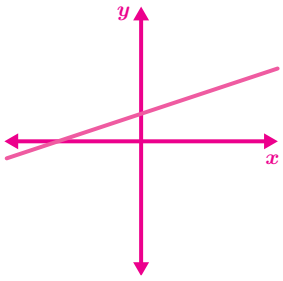
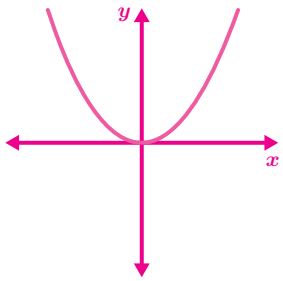
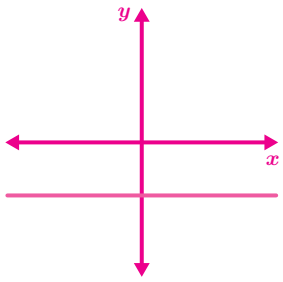
Domain: .....

Range: .....

Standard	MA.8.F.1.1
Problem(s)	1, 2a, 2b, 2c, 3a, 3b, 3c

Problem 1

Standard: MA.8.F.1.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
All correct choices and **no incorrect** choices.   	**One or two correct** choices and **no incorrect** choices. **All correct** choices and **one incorrect** choice.	**One or two correct** choices and **one incorrect** choice.	**Only incorrect** choices. **Two or more incorrect** choices with **some correct** choices.

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Problem 2a

Standards: MA.8.F.1.1, MTR.7.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. Yes. *Explanations vary.* • For each number of books, there is only one possible cost. • The number of books he chooses to print determines the cost. • The cost depends on the number of books.	**Correct** response with **minor flaws** in explanation. E.g., Response includes "Yes, because the more books he prints, the higher the total cost." **Incorrect** response with logical and **complete explanation**.	**Correct** response with **incomplete** explanation. **Incorrect** response with explanation that shows **partial understanding**.	**Incorrect** response with **no** explanation.

Problem 2b

Standards: MA.8.F.1.1 , MTR.7.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. Yes. *Explanations vary.* • For each cost, there is only one possible number of books he can print. • The cost determines the number of books. • The number of books he can print is dependent on the cost.	**Correct** response with **minor flaws** in explanation. E.g., Response includes "Yes, because the higher the total cost, the more books he will get." **Incorrect** response with logical and **complete explanation**.	**Correct** response with **incomplete** explanation. **Incorrect** response with explanation that shows **partial understanding**.	**Incorrect** response with **no** explanation.

Problem 2c			Standards: MA.8.F.1.1 , MTR.7.1
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response: **Independent variable: Books printed, b** **Dependent variable: Total cost, c**	Response shows **conceptual understanding** with minor errors. E.g., Incomplete identification, such as independent variable is books and dependent variable is cost.	Response shows **incomplete understanding** with significant errors. E.g., One variable is correctly identified. E.g., Variables are swapped.	Response shows **limited understanding.** E.g., Student does not mention "books printed, b" or "total cost, c" at all.

Problem 3a			Standards: MA.8.F.1.1, MTR.2.1
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response: Domain: 4, 7, 12 Range: 1, 8, 9	Response shows **conceptual understanding** with minor errors.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding**.

Problem 3b			Standards: MA.8.F.1.1, MTR.2.1
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response: Domain: 0, 6, 9 Range: 3, 5	Response shows **conceptual understanding** with minor errors. E.g., Correct response but includes 5 twice in the range.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding**.

Problem 3c			Standards: MA.8.F.1.1, MTR.2.1
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response: Domain: $-\infty < x < \infty$ Range: $y \geq 4$	Response shows **conceptual understanding** with minor errors. E.g., Correct response but uses strict inequality for range. E.g., Correct response but uses inclusive inequality for domain.	Response shows **incomplete understanding** with significant errors. E.g., Limits domain to visual curve, including endpoint values for domain. E.g., Includes all real values for the range.	Response shows **limited understanding**.

Name: ..... Date: ..... Period: .....

End-of-Unit Assessment

Unit 6

1. This table shows a linear relationship between the amount of water in a container and time.

Time (min)	Water (gal)
0	30
5	20
10	10

Which of these statements is true?

The water in the container is:

(A.) Increasing at 2 gallons per minute.

(B.) Increasing at 10 gallons per minute.

(C.) Decreasing at 2 gallons per minute.

(D.) Decreasing at 10 gallons per minute.

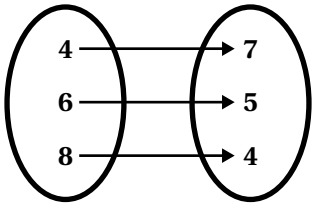
2. Determine whether each function is linear or nonlinear. Write linear or nonlinear in the blank under each representation.

a

x	y
0	6
4	6
8	6

.....

b



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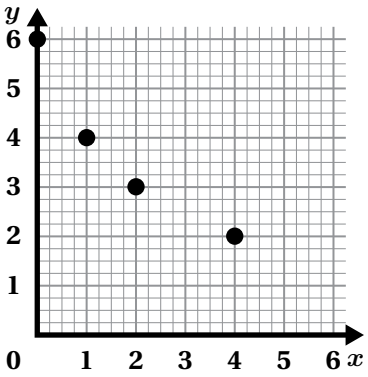
c



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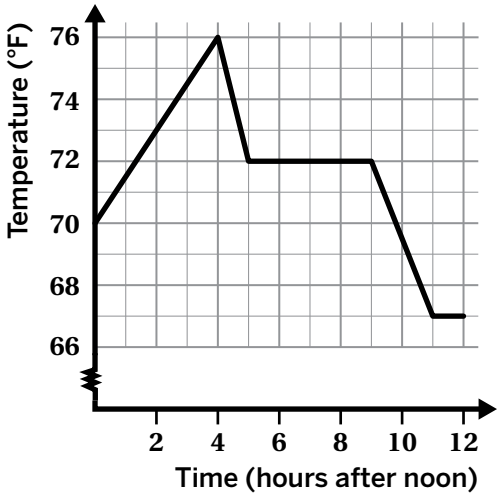
3. This graph shows the temperature in Mariam's house between noon and midnight one day.

Select *all* the true statements.

- ☐ **A.** Time is a function of temperature.
- ☐ **B.** The lowest temperature occurred between 4:00 PM and 5:00 PM.
- ☐ **C.** The temperature was increasing between 9:00 PM and 10:00 PM.
- ☐ **D.** The temperature was 74° twice during this time.
- ☐ **E.** There was a four-hour period during which the temperature did not change.



4 **a** What is the domain and range for this set of points?

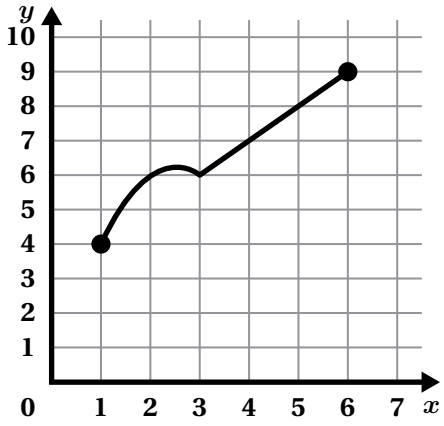
$\{(3, 5), (6, 9), (7, 9)\}$

Domain: ..... Range: .....

b What is the domain and range for the given graph?

Domain: .....

Range: .....



5. A football team played four quarters of a game. Their total points scored after each quarter is shown.

Quarter	1	2	3	4
Score	7	14	14	21

a Is the total points scored a function of the number of quarters? Circle one.

Yes No

Explain your thinking.

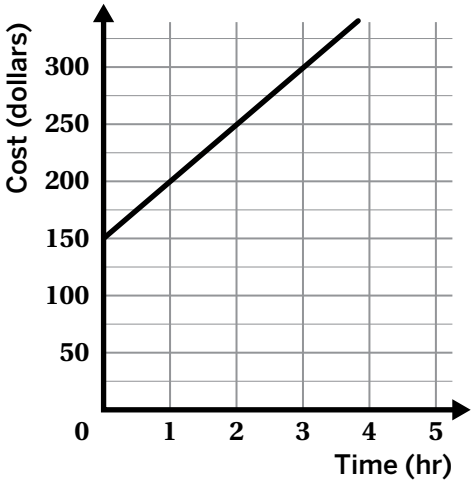
b Is there a linear relationship between the number of quarters and the total points scored? Circle one.

Yes No

Explain your thinking.

6. Two plumbing companies charge for each hour of work, plus a one-time fee.

Quality Plumbing charges according to this graph.



A-Plus Plumbing charges according to this table.

Time (hr)	Cost (dollars)
1	140
4	320
6	440

a How much does Quality Plumbing charge for each hour?

What is the one-time fee?

Show or explain your thinking.

b How much does A-Plus Plumbing charge for each hour?

What is the one-time fee?

Show or explain your thinking.

c Is the cost of using Quality Plumbing or A-Plus Plumbing ever the same for the same amount of time? Circle one.

Yes No

Show or explain your thinking.

Standard	MA.912.AR.3.5	MA.912.F.1.1	MA.912.F.1.2	MA.912.F.1.3
Problem(s)	1, 6a, 6b, 6c	4a, 4b, 5a	2, 5b	3, 6c

Problem 1

Standards: MA.8.AR.3.5, MTR.7.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: Decreasing at 2 gallons per minute.			**Incorrect** choice. Students who select *Increasing at 2 gallons per minute* may have calculated the correct rate but interpreted it incorrectly as an increase.

Problem 2a

Standards: MA.8.F.1.2, MTR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: linear			Response shows **limited understanding.**

Problem 2b

Standards: MA.8.F.1.2, MTR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: nonlinear		**understanding** with significant errors.	Response shows **limited understanding.**

Problem 2c

Standards: MA.8.F.1.2, MTR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: nonlinear		**understanding** with significant errors.	Response shows **limited understanding.**

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Problem 3

Standard: MA.8.F.1.3, MTR.7.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: • The temperature was $74°$ twice during this time. • There was a four-hour period during which the temperature did not change.	**One correct** choice and **no incorrect** choices. **Both correct** choices and **one incorrect** choice.	**One correct** choice and **one incorrect** choice.	**Only incorrect** choices. **Two or more incorrect** choices with **some correct** choices.

Problem 4a

Standards: MA.8.F.1.1, MTR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: Domain: $3, 6, 7$ Range: $5, 9$	Response shows **conceptual understanding** with minor errors. E.g., Correct response but includes 9 twice in the range.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding.**

Problem 4b

Standards: MA.8.F.1.1, MTR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: Domain: $1 \leq x \leq 6$ Range: $4 \leq y \leq 9$	Response shows **conceptual understanding** with minor errors. E.g., Correct response but uses strict inequalities for domain or range.	Response shows **incomplete understanding** with significant errors. E.g., Correct response but uses strict inequalities for both domain and range.	Response shows **limited understanding.**

Problem 5a

Standard: MA.8.F.1.1, MTR.7.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. Yes. *Explanations vary.* It is a function because there is a single output (the total points scored) for each input (the number of quarters).	**Correct** response with **minor flaws** in explanation. **Incorrect** response with logical and **complete explanation**.	**Correct** response with **incomplete** explanation. **Incorrect** response with explanation that shows **partial understanding**. E.g., Response includes "there are two outputs that are the same."	**Incorrect** response with **no** explanation.

Problem 5b

Standard: MA.8.F.1.2, MTR.7.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. No. *Explanations vary.* It is not a linear relationship because the rate of change is not always the same.	**Correct** response with **minor flaws** in explanation. **Incorrect** response with logical and **complete explanation**. E.g., Response includes "Yes, because the points increase by 7 each quarter."	**Correct** response with **incomplete** explanation. **Incorrect** response with explanation that shows **partial understanding**.	**Incorrect** response with **no** explanation.

Problem 6a

Standards: MA.8.AR.3.5, MTR.7.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. • Each hour: 50 dollars • One-time fee: 150 dollars *Explanations vary.* To determine the cost per hour, I looked at the slope of the line, which is 50. To determine the one-time fee, I looked at the y-intercept of the line.	**Correct** response with **minor flaws** in explanation. **Incorrect** response with logical and **complete explanation**. E.g., Response includes minor arithmetic errors.	**Correct** response with **incomplete** explanation. **Incorrect** response with explanation that shows **partial understanding**. E.g., Response includes the correct slope or y-intercept but not both.	**Incorrect** response with **no** explanation.

Problem 6b

Standards: MA.8.AR.3.5, MTR.7.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. • Each hour: 60 dollars • One-time fee: 80 dollars *Explanations vary.* To determine the cost per hour, find the rate of change: $\frac{440-140}{5}=60$. To determine the one-time fee, subtract $60 from $140.	**Correct** response with **minor flaws** in explanation. **Incorrect** response with logical and **complete explanation**. E.g., Response includes minor arithmetic errors.	**Correct** response with **incomplete** explanation. **Incorrect** response with explanation that shows **partial understanding**. E.g., Response includes the correct slope or y-intercept but not both.	**Incorrect** response with **no** explanation.

Problem 6c

Standards: MA.8.F. 1.3, MA.8 AR.3.5, MTR.2.1, MTR.7.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. Yes. *Explanations vary.* • A-Plus Plumbing has a lower one-time fee but costs more per hour, so it will eventually catch up to Quality Plumbing. • For 7 hours of work, both plumbing companies charge a total of $500.	**Correct** response with **minor flaws** in explanation. **Incorrect** response with logical and **complete explanation**.	**Correct** response with **incomplete** explanation. **Incorrect** response with explanation that shows **partial understanding**. E.g., Response includes an accurate graph of A-Plus plumbing and concludes that they do not meet on the graph.	**Incorrect** response with **no** explanation.

Name: ..... Date: ..... Period: .....

End-of-Unit Assessment

Unit 7.1

1. This table shows a linear relationship between Nikolai's savings and time since his birthday.

Time (months)	Savings ($)
0	2
3	11
10	32
12	38

Which of these statements is true?

Nikolai's savings is:

(A.) Increasing by 3 dollars per month.

(B.) Increasing by 9 dollars per month.

(C.) Decreasing by 3 dollars per month.

(D.) Decreasing by 9 dollars per month.

2. Determine whether each function is linear or nonlinear.

a

x	y
0	0
3	6
6	24

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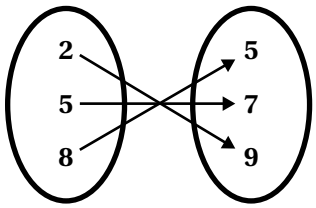
b



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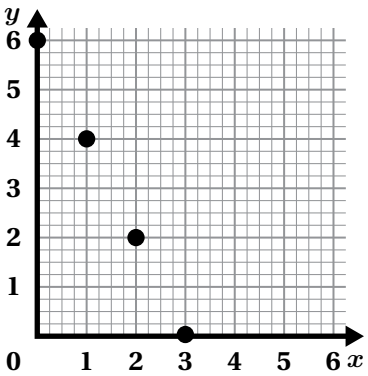

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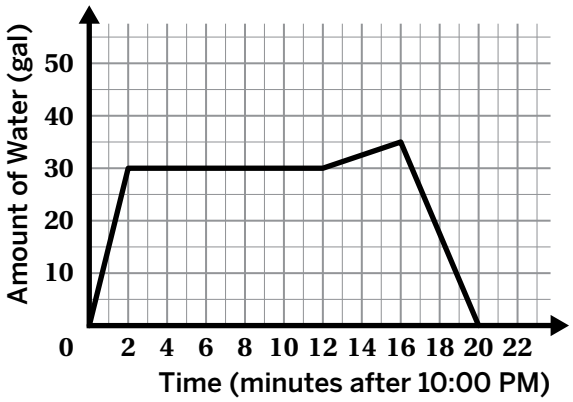
3. This graph shows the amount of water in a bathtub starting at 10:00 PM.



Select *all* the true statements.

- ☐ **A.** It took 4 minutes from when the tub was most full for it to become empty.
- ☐ **B.** The tub was filling faster at 10:14 PM than at 10:01 PM.
- ☐ **C.** At 10:06 PM, the tub was neither filling nor emptying.
- ☐ **D.** The maximum amount of water in the tub was about 35 gallons.
- ☐ **E.** The amount of water in the tub stayed the same from 10:16 PM to 10:20 PM.

4 **a** What is the domain and range for this set of points

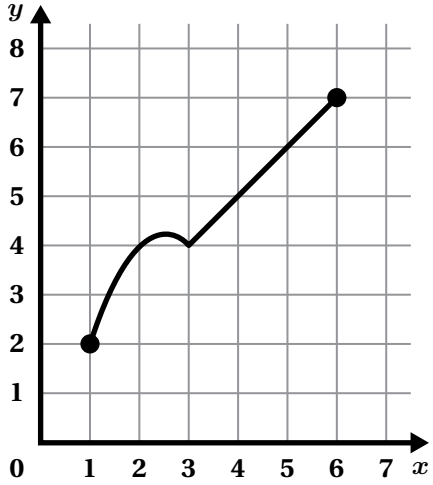
$\{(5,8),(3,7),(0,8)\}$

Domain: ..... Range: .....

b What is the domain and range for the given graph?

Domain: .....

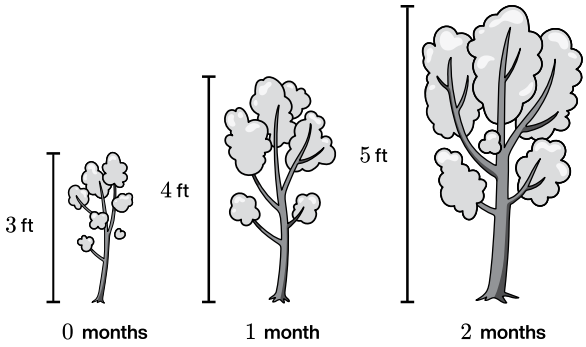
Range: .....



End-of-Unit Assessment (continued)

Unit 6

5. A tree planted today has a height of 3 feet and will grow 1 foot each month for a year.



a Is the height of the tree a function of the number of months? Circle one.

Yes No

Explain your thinking.

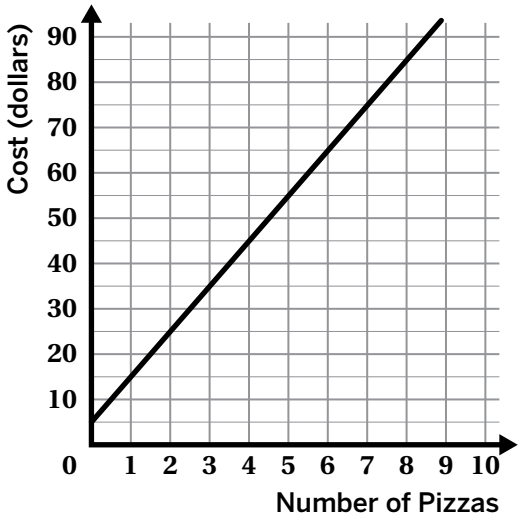
b Is there a linear relationship between the height of the tree and the number of months for the year? Circle one.

Yes No

Explain your thinking.

6. Two pizza restaurants charge for each pizza plus a delivery fee.

Pizza Palace charges according to this graph.



Za Kingdom charges according to this table.

Pizzas	Cost (dollars)
1	21
3	37
10	93

a How much does Pizza Palace charge for each pizza?

What is the delivery fee?

Show or explain your thinking.

b How much does Za Kingdom charge for each pizza?

What is the delivery fee?

Show or explain your thinking.

c Will the total cost to deliver the same number of pizzas ever be the same for Pizza Palace and Za Kingdom? Circle one.

Yes No

Show or explain your thinking.

Standard	MA.912.AR.3.5	MA.912.F.1.1	MA.912.F.1.2	MA.912.F.1.3
Problem(s)	1, 6a, 6b, 6c	4a, 4b, 5a	2a, 2b, 2c, 5b	3, 6c

Problem 1

Standards: MA.8.AR.3.5, MTR.7.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: Increasing by 3 dollars per month.			**Incorrect** choice. Students who select *Increasing by 9 dollars per month* may have correctly interpreted the change between rows but not the rate of change.

Problem 2a

Standards: MA.8.F.1.2, MTR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: nonlinear			Response shows **limited understanding.**

Problem 2b

Standards: MA.8.F.1.2, MTR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: linear		**understanding** with significant errors.	Response shows **limited understanding.**

Problem 2c

Standards: MA.8.F.1.2, MTR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: linear			Response shows **limited understanding.**

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Problem 3

Standard: MA.8.F.1.3, MTR.7.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
All correct choices and **no incorrect** choices. • **It took 4 minutes from when the tub was most full for it to become empty.** • **At 10:06 PM, the tub was neither filling nor emptying.** • **The maximum amount of water in the tub was about 35 gallons.**	**One or two correct** choices and **no incorrect** choices. **All correct** choices and **one incorrect** choice.	**One or two correct** choices and **one incorrect** choice.	**Only incorrect** choices. **Two or more incorrect** choices with **some correct** choices.

Problem 4a

Standards: MA.8.F.1.1, MTR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: **Domain: 3, 5, 0** **Range: 7, 8**	Response shows **conceptual understanding** with minor errors. E.g., Correct response but includes 8 twice in the range.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding.**

Problem 4b

Standards: MA.8.F.1.1, MTR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: **Domain: $1 \leq x \leq 6$** **Range: $2 \leq y \leq 7$**	Response shows **conceptual understanding** with minor errors. E.g., Correct response but uses strict inequalities for domain or range.	Response shows **incomplete understanding** with significant errors. E.g., Correct response but uses strict inequalities for both domain and range.	Response shows **limited understanding.**

Problem 5a

Standard: MA.8.F.1.1, MTR.7.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. Yes. *Explanations vary.* It is a function because there is a single output (the height of the tree) for each input (the number of months).	**Correct** response with **minor flaws** in explanation. E.g., Response includes "Yes, because the tree gets taller each month." **Incorrect** response with logical and **complete explanation**.	**Correct** response with **incomplete** explanation. **Incorrect** response with explanation that shows **partial understanding**.	**Incorrect** response with **no** explanation.

Problem 5b

Standard: MA.8.F.1.2, MTR.7.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. Yes. *Explanations vary.* It is linear because the growth rate of 1 foot per month is a constant rate of change.	**Correct** response with **minor flaws** in explanation. **Incorrect** response with logical and **complete explanation**.	**Correct** response with **incomplete** explanation. E.g., Response includes "Yes, because the tree grows by one foot." **Incorrect** response with explanation that shows **partial understanding**.	**Incorrect** response with **no** explanation.

Problem 6a

Standards: MA.8.AR.3.5, MTR.7.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. • Cost for each pizza: 10 dollars • Delivery fee: 5 dollars *Explanations vary.* To determine the cost per pizza, I looked at the slope of the line, which is 10. To determine the delivery fee, I looked at the y-intercept of the line.	**Correct** response with **minor flaws** in explanation. **Incorrect** response with logical and **complete explanation**. E.g., Response includes minor arithmetic errors.	**Correct** response with **incomplete** explanation. **Incorrect** response with explanation that shows **partial understanding**. E.g., Response includes the correct slope or y-intercept but not both.	**Incorrect** response with **no** explanation.

Problem 6b

Standards: MA.8.AR.3.5, MTR.7.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. • Each pizza: 8 dollars • Delivery fee: 13 dollars *Explanations vary.* To determine the cost per pizza, find the rate of change: $\frac{37-21}{2} = 8$. To determine the delivery fee, subtract \$8 from \$21.	**Correct** response with **minor flaws** in explanation. **Incorrect** response with logical and **complete explanation**. E.g., Response includes minor arithmetic errors.	**Correct** response with **incomplete** explanation. **Incorrect** response with explanation that shows **partial understanding**. E.g., Response includes the correct slope or y-intercept but not both.	**Incorrect** response with **no** explanation.

Problem 6c

Standards: MA.8.F.1.3, MA.8.AR.3.5, MTR.2.1, MTR.7.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. Yes. *Explanations vary.* • Pizza Palace has a lower delivery fee but costs more per pizza, so it will eventually catch up to Za Kingdom. • For delivery of 4 pizzas, both restaurants charge a total of \$45.	**Correct** response with **minor flaws** in explanation. **Incorrect** response with logical and **complete explanation**.	**Correct** response with **incomplete** explanation. **Incorrect** response with explanation that shows **partial understanding**.	**Incorrect** response with **no** explanation.

Unit 6
Show What You Know PDFs

Name: Date: Period:

Show What You Know

6.01

Every month of the year is associated with a flower, known as birth month flowers. Many of the flowers are selected for their connection to the characteristics of the month they are associated with.

Both of these tables show a relationship between birthday and flower.

Which table could represent a function? Circle one.

Table A Table B Both Neither

Explain your thinking.

Table A

Input	Output
Daisy	April 1
Daisy	April 8
Rose	June 5
Carnation	January 23
Holly	December 25

Table B

Input	Output
April 1	Daisy
April 8	Daisy
June 5	Rose
January 23	Carnation
December 25	Holly

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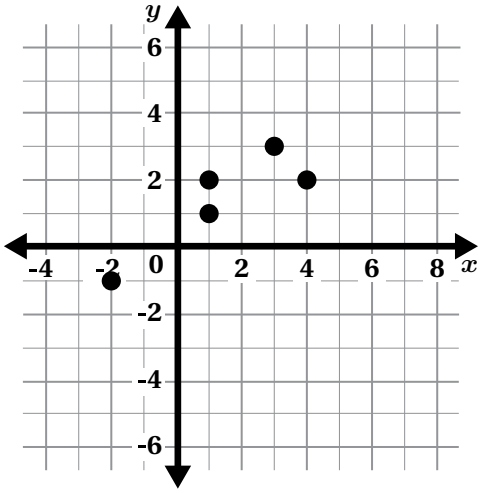
Name: Date: Period:

Show What You Know

6.02

What is the domain and range of the relation shown? Express your answers as a bracketed list of elements.



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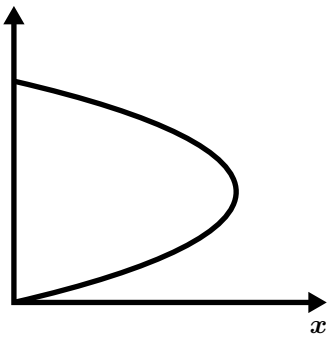
Name: Date: Period:

Show What You Know

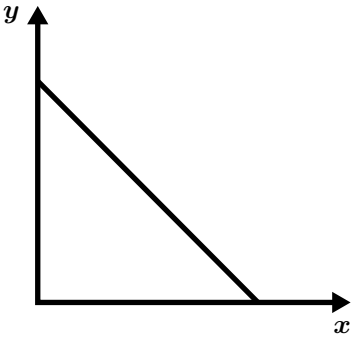
6.03

Select *all* the graphs that represent a function.

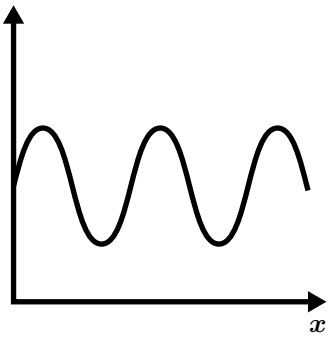
☐ A.



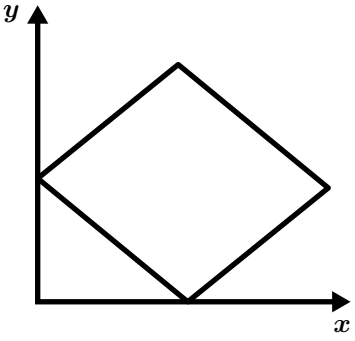
☐ B.



☐ C.



☐ D.



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Name: Date: Period:

Show What You Know

6.04

Ariel earns $\$10$ per hour at her part-time summer job. She wants to know the total amount of money, t, she'll earn after h hours.

In this situation, which quantity is the independent variable? Which is the dependent variable?

Independent variable:

Dependent variable:

Explain your thinking.

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Name: Date: Period:

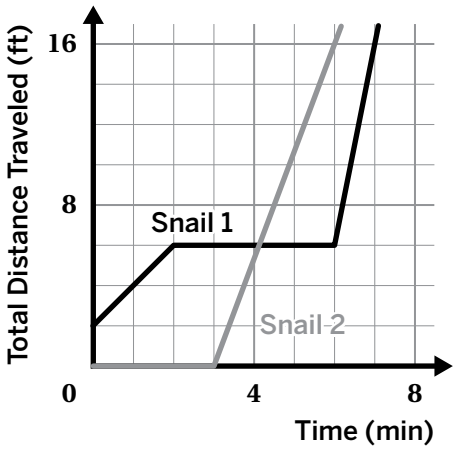
Show What You Know

6.05

Two snails competed in a 16-foot race.

The graph shows their distance vs. time relationships.

Write a story based on the graph.



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Name: Date: Period:

Show What You Know

6.06

A function includes the points shown in the table below. Three statements were written about the function, based on the values provided in the table. Determine if they are true or false. Explain your reasoning.

x	2	3	4	5
y	1	3	5	7

a The function is linear.

b The rate of change shown in the table is $\frac{2}{1}$.

c The function is a proportional relationship.

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Name: Date: Period:

Show What You Know

6.07

Tiara planted two trees in the community center. Both trees grow at a constant rate. The graph and table represent each tree's growth over time.

Tree A

Tree B

Months Since Planted	Height (in.)
1	48
3	51
7	57

a Which tree is growing at a faster rate? Explain your thinking.

b Which tree was taller when it was first planted? Explain your thinking.

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Show What You Know **Lesson 1**

Name: _____ Date: _____ Period: _____

Show What You Know 6.01

Every month of the year is associated with a flower, known as birth month flowers. Many of the flowers are selected for their connection to the characteristics of the month they are associated with.

Both of these tables show a relationship between birthday and flower.

Which table could represent a function? Circle one.

Table A (Table B) Both Neither

Explain your thinking.

Explanations vary.

- Table B could represent a function because for each date (input), there is only one possible flower (output).
- Table A is not a function because each flower (input) has many different outputs. For example, the input Daisy can have an output of both April 1 and April 8.

Table A

Input	Output
Daisy	April 1
Daisy	April 8
Rose	June 5
Carnation	January 23
Holly	December 25

Table B

Input	Output
April 1	Daisy
April 8	Daisy
June 5	Rose
January 23	Carnation
December 25	Holly

Accelerated 7 265

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Show What You Know **Lesson 2**

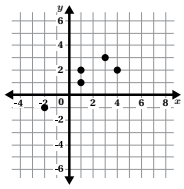
Name: _____ Date: _____ Period: _____

Show What You Know 6.02

What is the domain and range of the relation shown? Express your answers as a bracketed list of elements.

domain - {-2, 1, 3, 4}

range - {-1, 1, 2, 3}



Accelerated 7 266

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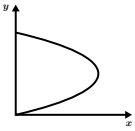
Show What You Know **Lesson 3**

Name: _____ Date: _____ Period: _____

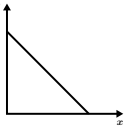
Show What You Know 6.03

Select *all* the graphs that represent a function.

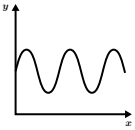
☐ A.



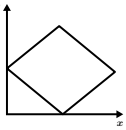
☑ B.



☑ C.



☐ D.



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Show What You Know **Lesson 4**

Name: _____ Date: _____ Period: _____

Show What You Know 6.04

Ariel earns $10 per hour at her part-time summer job. She wants to know the total amount of money, t, she'll earn after h hours.

In this situation, which quantity is the independent variable? Which is the dependent variable?

Independent variable: number of hours worked, h

Dependent variable: total amount of money earned, t

Explain your thinking.

Explanations vary. The total amount of money she earns, t, will depend on how many hours, h, Ariel has worked. That makes the total amount of money the dependent variable and the number of hours of work the independent variable.

Accelerated 7 268

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Show What You Know **Lesson 5**

Name: _____ Date: _____ Period: _____

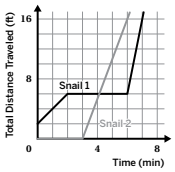
Show What You Know 6.05

Two snails competed in a 16-foot race.

The graph shows their distance vs. time relationships.

Write a story based on the graph.

Responses vary. Snail 1 has a head start by 2 feet and begins moving at a rate of 2 feet per minute. Snail 2 didn't realize the race had started until 3 minutes in. Snail 2 started to move as quickly as possible to make up for lost time. Snail 2 got tired and took a rest from minute 2 to minute 6. When Snail 1 realized Snail 2 was at the end, Snail 1 tried to catch up at the last minute going 5 feet per minute, but still lost.



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Show What You Know **Lesson 6**

Name: _____ Date: _____ Period: _____

Show What You Know 6.06

A function includes the points shown in the table below. Three statements were written about the function, based on the values provided in the table. Determine if they are true or false. Explain your reasoning.

x	2	3	4	5
y	1	3	5	7

a. The function is linear.

b. The rate of change shown in the table is $\frac{2}{1}$.

c. The function is a proportional relationship.

A. True; There is a constant rate of change.

B. True; $\frac{3-1}{3-2} = \frac{2}{1} = 2$.

C. False; The function does not pass through the origin.

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Show What You Know **Lesson 7**

Name: _____ Date: _____ Period: _____

Show What You Know 6.07

Tiara planted two trees in the community center. Both trees grow at a constant rate. The graph and table represent each tree's growth over time.

Tree A

Tree B

Months Since Planted	Height (in.)
1	48
3	51
7	57

a. Which tree is growing at a faster rate? Explain your thinking.

Tree A. *Explanations vary.* Tree A is growing 2 inches each month, while Tree B is growing 1.5 inches each month.

b. Which tree was taller when it was first planted? Explain your thinking.

Tree B. *Explanations vary.* Tree A was 45 inches tall when it was planted, while Tree B was 46.5 inches tall.

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Unit 7
Assessments and Rubrics

Name: ..... Date: ..... Period: .....

Pre-Unit Check

Unit 7

1. A ticket at a movie theater costs $\$9.25$.

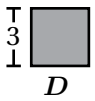
a What is the total cost for 20 tickets?

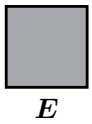
b Write an equation to represent the relationship between the number of tickets purchased, n, and the total cost of the tickets, c.

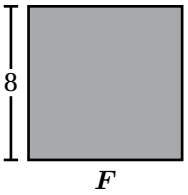
c How many tickets were purchased if the total cost of tickets was $\$240.50$?

Explain your thinking.

2. Here are three squares:







a Complete the table with information about each square.

Square	Side Length (in.)	Perimeter (in.)	Area (sq. in.)
D	3	12	9
E		20	
F	8		

b Write an equation for the relationship between the perimeter of the square, P, and its side length, l.

c Write an equation for the relationship between the area of the square, A, and its side length, l.

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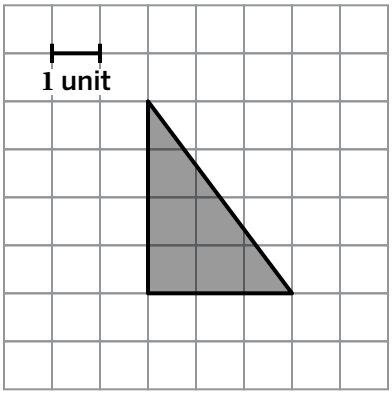
Pre-Unit Check (continued)

Unit 7

3. One formula for the area of a triangle is $A = \frac{1}{2} \cdot b \cdot h$.

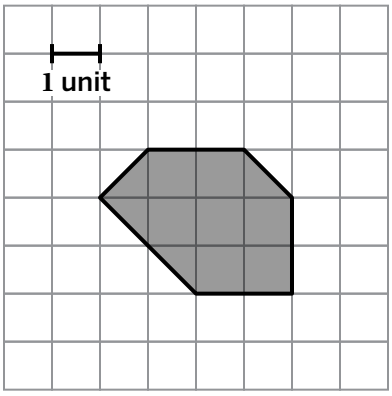
The variable b represents the length of the base of the triangle and h represents its height.

What is the area of this triangle?



4. Use any strategy to determine the area of this figure. Draw on the figure if it helps you with your thinking.

Explain your thinking.



5. The area of this shape is $4 \cdot 3^2$ square units.

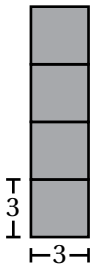
What is another way to write the shape's area?

(A.) 36 square units

(B.) 144 square units

(C.) Neither

Explain your thinking.



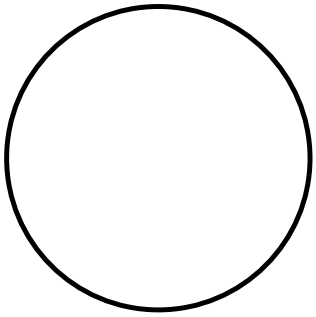
Name: ..... Date: ..... Period: .....

Sub-Unit Quiz

Unit 7

1. A circular place mat has a diameter of 10 inches. What is the exact area of this place mat?

2. This circle has a circumference of 40 centimeters. What is the length of its diameter?



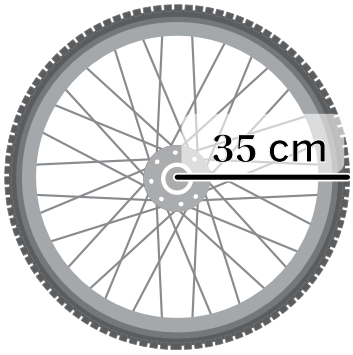
A. 40π centimeters

B. $\frac{40}{\pi}$ centimeters

C. $\frac{20}{\pi}$ centimeters

D. 20 centimeters

3. A wheel has a radius of 35 centimeters. Determine its circumference.



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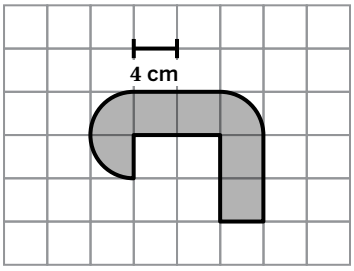
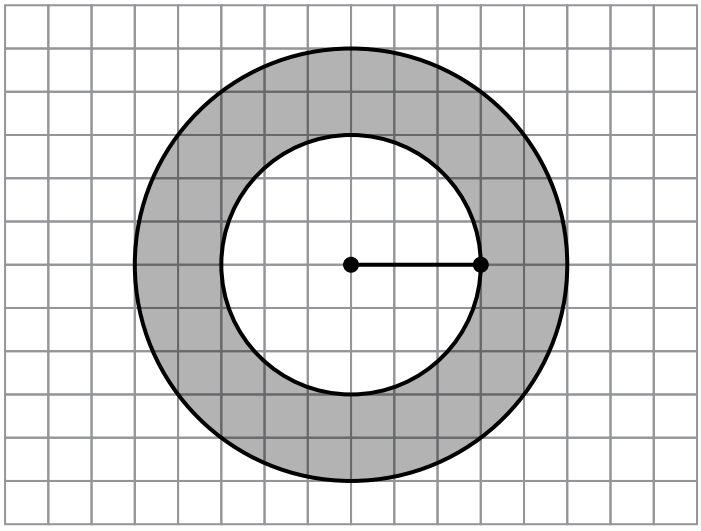
Sub-Unit Quiz (continued)

4. Determine the area of the composite figure.

(Use $\pi = 3.14$)



5. Determine the exact area of the shaded region. Each square has an area of 1 unit.



6. The circumference of a circle is 24π cm. What is the area of the circle, in terms of π? Show or explain your thinking.

Standard	MA.7.GR.1.2	MA.7.GR.1.3	MA.7.GR.1.4
Problem(s)	4	2, 3, 5, 6	1, 4, 5, 6

Problem 1

Standard: MA.7.GR.1.4

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: 25π square inches	Response shows **conceptual understanding** with minor errors.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding**.

Problem 2

Standard: MA.7.GR.1.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: $\frac{40}{\pi}$ centimeters			**Incorrect** choice. Students who select 40π *cm* may have calculated the circumference for a circle whose diameter is 40 cm. Students who select $\frac{20}{\pi}$ *cm* may have calculated the radius of the circle. Students who select 20 *cm* may have calculated the radius for a circle with a diameter of 40 cm.

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Problem 3

Standard: MA.7.GR.1.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: *Responses vary.* • 70π centimeters • 219.8 centimeters • 220 centimeters	Response shows **conceptual understanding** with minor errors. Students who write "35π cm" may have calculated the circumference of a circle with a diameter of 35 cm.	Response shows **incomplete understanding** with significant errors. Students who write "70 cm" may have calculated the diameter of a circle with a radius of 35 cm.	Response shows **limited understanding**.

Problem 4

Standards: MA.7.1.GR.1.2, MA.7.1.GR.1.4

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $A = 101.68$ cm^2	Response shows **conceptual understanding** with minor errors. E.g., Student makes minor computation errors or does not include the **correct** label.	Response shows **incomplete understanding** with significant errors. E.g., Student forgets to include the quarter circles or does not use the area formula correctly.	Response shows **limited understanding**. E.g., Student finds the perimeter instead of the area or finds the area of a single square.

Problem 5

Standards: MA.7.1.GR.1.3, MA.7.1.GR.1.4

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $A = 16\pi$ square units	Response shows **conceptual understanding** with minor errors. E.g., Student makes minor computation errors or does not include the **correct** label.	Response shows **incomplete understanding** with significant errors. E.g., Student added the areas instead of subtracting them.	Response shows **limited understanding**. E.g., Student does not use the correct formula to find the area of the circles.

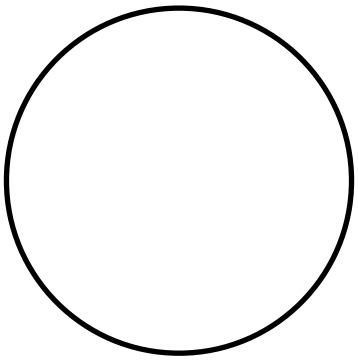
Problem 6			Standards: MA.7.1.GR.1.3, MA.7.1.GR.1.4
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response: **Responses vary.** **First, I need to find the radius of the circle using the circumference.** $C = \pi d$ $24\pi = \pi d$ $\frac{24\pi}{\pi} = \frac{\pi d}{\pi}$ $24 = d$ **The diameter is equal to $2r$, so $24 = 2r$ or $r = 12$.** $A = \pi r^2$ $A = \pi(12^2)$ $A = 144\pi$ cm^2	Response shows **conceptual understanding** with minor errors. E.g., Student makes minor computation errors, does not include the correct label, or does not show/explain one of the steps.	Response shows **incomplete understanding** with significant errors. E.g., Student uses the diameter instead of the radius in the area formula.	Response shows **limited understanding**. E.g., Student uses the value of the circumference as the radius.

Name: ..... Date: ..... Period: .....

End-of-Unit Assessment

Unit 7

1. A circle has a radius of 50 centimeters. Which of these is closest to its area?



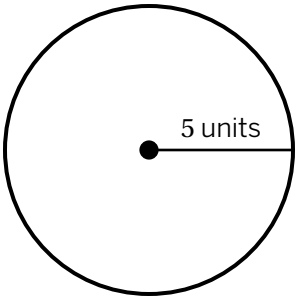
(A.) 157 square centimeters

(B.) 314 square centimeters

(C.) 7,854 square centimeters

(D.) 15,708 square centimeters

2. This circle has a radius of 5 units. Three students tried to calculate the circumference.



Order their answers from farthest from the exact circumference to closest to the exact circumference.

31.4 units	31.4π units	10π units

Farthest from exact circumference **Closest to exact circumference**

3. Decide whether each quantity describes a circle's circumference or area. Circle your response.

a	The amount of paint needed to cover a circular canvas.	Circumference	Area
b	How long it takes to run around a circular track.	Circumference	Area
c	The amount of ribbon needed to wrap around a circular present.	Circumference	Area
d	The amount of grass inside of a circular track.	Circumference	Area

4. DeShawn needs grass seed to cover a circular field with a diameter of 200 feet. How many square feet does DeShawn need to cover with grass seed?

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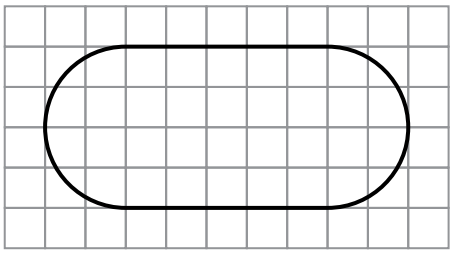
End-of-Unit Assessment (continued)

5. Calculate the area of the composite figure below.

Each square has an area of 1 unit. (Use $\pi = 3.14$)



6. A circular fountain in a park has a diameter of 10 meters. The park manager wants to install a decorative tile border around the fountain's edge.

a What is the circumference of the fountain? (Use $\pi = 3.14$.)

b If the manager also wants to cover the entire base of the fountain with blue tiles, what is the area of the base of the fountain?

7. A juice company packages its drinks in cylindrical cans. Each can has a diameter of 8 cm and a height of 12 cm.

a Find the volume of one juice can. (Use $\pi = 3.14$.)

b If the factory produces 500 cans in one day, what is the total volume of juice produced?

8. Your neighbor owns a rain barrel with a radius of 14 inches and a height of 39 inches. He paints the entire outside and top of the barrel a different color. How much paint did your neighbor use to cover these areas? (Use $\pi = 3.14$.)

Standard	MA.7.GR.1.3	MA.7.GR.1.4	MA.7.GR.2.2	MA.7.GR.2.3
Problem(s)	2, 3, 6a	1, 3, 4, 5, 6b	8	7

Problem 1

Standard: MA.7.GR.1.4

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: **7,854 square centimeters**			**Incorrect** choice. Students who select 157 *square centimeters* may have multiplied the radius by π instead of squaring the radius first. Students who select 314 *square centimeters* may have calculated the circumference of the circle instead of its area. Students who select 15,708 *square centimeters* may have combined the circumference and area formulas, calculating $2\pi r^2$.

Problem 2

Standards: MA7.GR.1.3, MTR.3.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: **From farthest from exact to closest to exact:** • **31.4π units** • **31.4 units** • **10π units**		Response shows **incomplete understanding** with significant errors. E.g., Response correctly identifies the farthest or closest measurement. • 31.4π units • 10π units • 31.4 units or • 31.4 units • 31.4π units • 10π units	Response shows **limited understanding**. E.g., All responses are in the incorrect location.

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Problem 3a–d

Standards: MA.7.GR.1.3, MA.7.AR.1.4

4 Meeting	3 Approaching	2 Developing	1 Beginning
All correct choices and **no incorrect** choices. Area • The amount of paint • The amount of grass Circumference • How long it takes to run • The amount of ribbon	**Three correct** choices and **one incorrect** choice.	**Two correct** choices and **two incorrect** choices.	**Three or more incorrect** choices.

Problem 4

Standards: MA.7.AR.1.4, MTR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: *Responses vary.* • 10000π sq. ft • 31400 sq. ft • $\frac{220000}{7}$ sq. ft	Response shows **conceptual understanding** with minor errors. E.g., Response identifies the radius of the field as 100 feet and correctly uses the formula for the area of a circle, but has a calculation error.	Response shows **incomplete understanding** with significant errors. Students who write "200π sq. ft" may have calculated the circumference.	Response shows **limited understanding**.

Problem 5

Standard: MA.7.GR.1.4

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $A = 32.56$ square units	Response shows **conceptual understanding** with minor errors. E.g., Student makes a minor computation error or forgets to square the units.	Response shows **incomplete understanding** with significant errors. E.g., Student calculates the area of the rectangle and two half circle, but forgets to add the other.	Response shows **limited understanding**. E.g., Student does not use area formulas or the **correct** calculations.

Problem 6a

Standard: MA.7.GR.1.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $C = 31.4$ meters	Response shows **conceptual understanding** with minor errors. E.g., Student makes a computation error or unnecessarily rounds.	Response shows **incomplete understanding** with significant errors. E.g., Student calculates the circumference using the radius instead of the diameter.	Response shows **limited understanding**. E.g., Student finds the area instead of the circumference.

Problem 6b

Standard: MA.7.GR.1.4

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $A = 78.5$ square meters	Response shows **conceptual understanding** with minor errors. E.g., Student makes a computation error or unnecessarily rounds.	Response shows **incomplete understanding** with significant errors. E.g., Student calculates the area using the diameter instead of the radius.	Response shows **limited understanding**. E.g., Student finds the circumference instead of the area.

Problem 7a

Standard: MA.7.GR.2.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $V = 602.88$ cm^3	Response shows **conceptual understanding** with minor errors. E.g., Student makes a computation error or unnecessarily rounds.	Response shows **incomplete understanding** with significant errors. E.g., Student calculates the area using the diameter instead of the radius.	Response shows **limited understanding**. E.g., Student does not use the volume formula.

Problem 7b			Standard: MA.7.GR.2.3
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response: $V = 301{,}440\ \text{cm}^3$	Response shows **conceptual understanding** with minor errors. E.g., Students use their **incorrect** answers from 4a, but correctly multiplies it by 500.	Response shows **incomplete understanding** with significant errors. E.g., Student multiplies the **correct** answer by 24 hours for one day.	Response shows **limited understanding**. E.g., Students add 500 to their answers from 4a.

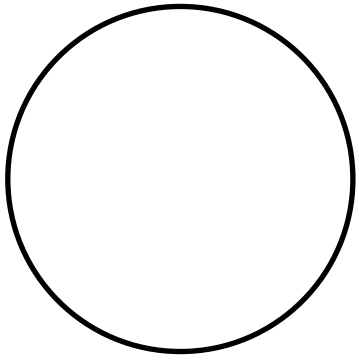
Problem 8			Standard: MA.7.GR.2.2
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response: $SA = 4{,}044.32\ \text{in}^3$	Response shows **conceptual understanding** with minor errors. E.g., Student makes a computation error or fails to use the proper label.	Response shows **incomplete understanding** with significant errors. E.g., Student uses the volume formula instead of the surface area formula or adds an extra surface area for the bottom of the barrel.	Response shows **limited understanding**. E.g., Student does not use a formula and just adds the numbers.

Name: ..... Date: ..... Period: .....

End-of-Unit Assessment

Unit 7

1. A circle has a radius of 40 centimeters. Which of these is closest to its circumference?



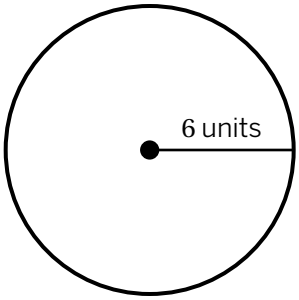
(A.) 126 centimeters

(B.) 251 centimeters

(C.) $1{,}600$ centimeters

(D.) $5{,}027$ centimeters

2. This circle has a radius of 6 units. Three students tried to calculate the area.



Order their answers from farthest from the exact area to closest to the exact area.

113.1 square units	36π square units	113.1π square units

Farthest from exact area **Closest to exact area**

3. Decide whether each quantity describes a circle's circumference or area. Circle your response.

a	The amount of glass in a circular window.	Circumference	Area
b	The number of tiles needed to go around a circular pool.	Circumference	Area
c	The amount of paint needed to paint a circular table top.	Circumference	Area
d	The distance a toy car travels around a circular track.	Circumference	Area

4. Brielle needs to paint the bottom of a circular pool with a diameter of 24 feet. How many square feet does Brielle need to cover with paint?

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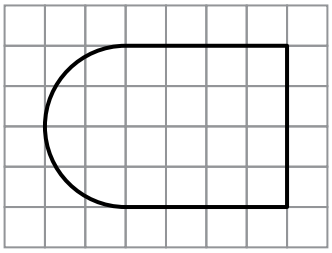
End-of-Unit Assessment (continued)

5. Calculate the area of the composite figure below.

Each square has an area of 1 unit. (Use $\pi = 3.14$.)



6. A gardener plans to create a circular flower bed with a diameter of 12 meters in a public park. She will place a stone border around the edge of the flower bed.

a What is the circumference of the flower bed? (Use $\pi = 3.14$.)

b If the gardener also wants to cover the entire base of the flower bed with mulch, what is the area of the base of the flower bed?

7. A candlemaker produces candles using cylindrical molds. Each mold has a diameter of 10 cm and a height of 15 cm.

a Find the volume of one candle. (Use $\pi = 3.14$.)

b If the candlemaker produces 400 candles in one day, what is the total volume of wax used?

8. Your hometown is repainting a cylindrical water tower to match the high school colors. The water tower has a radius of 12 feet and a height of 42 feet. How much paint is needed to cover the top and the entire sides? (Use $\pi = 3.14$.)

Standard	MA.7.GR.1.3	MA.7.GR.1.4	MA.7.GR.2.2	MA.7.GR.2.3
Problem(s)	2, 3, 6a	1, 3, 4, 5, 6b	8	7

Problem 1

Standard: MA.7.GR.1.4

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: 251 square centimeters			**Incorrect** choice. Students who select 126 *centimeters* may have multiplied the radius by π instead of the diameter. Students who select 5,027 *centimeters* may have calculated the area of the circle instead of its circumference. Students who select 1,600 *centimeters* may have calculated r^2.

Problem 2

Standards: MA7.GR.1.3, MTR.3.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: From farthest from exact to closest to exact: • 113.1π sq. units • 113.1 sq. units • 36π sq. units		Response shows **incomplete understanding** with significant errors. E.g., Response correctly identifies the farthest or closest measurement. • 113.1π sq. units • 36π sq. units • 113.1 sq. units or • 113.1 sq. units • 113.1π sq. units • 36π sq. units	Response shows **limited understanding**. E.g., All responses are in the incorrect location.

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Problem 3a–d

Standards: MA.7.GR.1.3, MA.7.AR.1.4

4 Meeting	3 Approaching	2 Developing	1 Beginning
All correct choices and **no incorrect** choices. Area • The amount of glass • The amount of paint Circumference • The number of tiles • The distance a toy car travels	**Three correct** choices and **one incorrect** choice.	**Two correct** choices and **two incorrect** choices.	**Three or more incorrect** choices.

Problem 4

Standards: MA.7.AR.1.4, MTR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: *Responses vary.* • 144π sq. ft • 452.16 sq. ft • $\frac{3168}{7}$ sq. ft	Response shows **conceptual understanding** with minor errors. E.g., Response identifies the radius of the pool as 12 feet and correctly uses the formula for the area of a circle, but has a calculation error.	Response shows **incomplete understanding** with significant errors. Students who write "24π sq. ft" may have calculated the circumference.	Response shows **limited understanding**.

Problem 5

Standard: MA.7.GR.1.4

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $A = 22.28$ units^2	Response shows **conceptual understanding** with minor errors. E.g., Student makes a minor computation error or forgets to square the units.	Response shows **incomplete understanding** with significant errors. E.g., Student calculates the area of the square and one half circle but forgets to add the other.	Response shows **limited understanding**. E.g., Student does not use area formulas or the correct calculations.

Problem 6a			Standard: MA.7.GR.1.3
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response: $C = 37.68$ meters	Response shows **conceptual understanding** with minor errors. E.g., Student makes a computational error or unnecessarily rounds.	Response shows **incomplete understanding** with significant errors. E.g., Student calculates the circumference using the radius instead of the diameter.	Response shows **limited understanding**. E.g., Student finds the area instead of the circumference.

Problem 6b			Standard: MA.7.GR.1.3
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response: $A = 113.04$ square meters	Response shows **conceptual understanding** with minor errors. E.g., Student makes a computation error or unnecessarily rounds.	Response shows **incomplete understanding** with significant errors. E.g., Student calculates the area using the diameter instead of the radius.	Response shows **limited understanding**. E.g., Student finds the circumference instead of the area.

Problem 7a			Standard: MA.7.GR.2.3
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response: $V = 1{,}177.5$ cm^3	Response shows **conceptual understanding** with minor errors. E.g., Student makes a computation error or unnecessarily rounds.	Response shows **incomplete understanding** with significant errors. E.g.,Student calculates the area using the diameter instead of the radius.	Response shows **limited understanding**. E.g., Student does not use the volume formula.

Problem 7b			**Standard:** MA.7.GR.2.3
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response: $V = 471{,}000\ \text{cm}^3$	Response shows **conceptual understanding** with minor errors. E.g., Students use their incorrect answers from 4a, but correctly multiplies it by 400.	Response shows **incomplete understanding** with significant errors. E.g., Student multiplies the correct answer by 24 hours for one day.	Response shows **limited understanding**. E.g., Students add 400 to their answers from 4a.

Problem 8			**Standard:** MA.7.GR.2.2
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response: $SA = 3{,}617.28\ \text{in}^3$	Response shows **conceptual understanding** with minor errors. E.g., Student makes a computation error or fails to use the proper label.	Response shows **incomplete understanding** with significant errors. E.g., Student uses the volume formula instead of the surface area formula or adds an extra surface area for the bottom of the barrel.	Response shows **limited understanding**. E.g., Student does not use a formula and just adds the numbers.

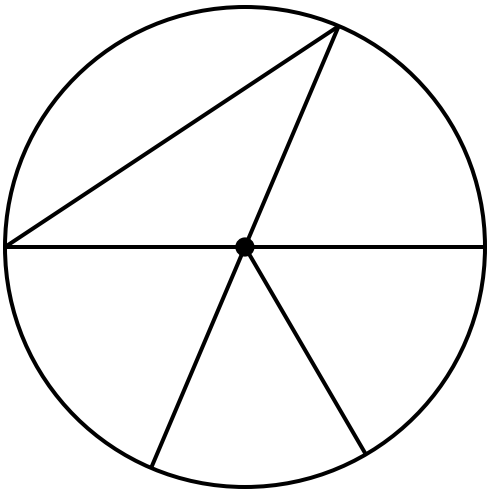
Unit 7
Show What You Know PDFs

Name: Date: Period:

Show What You Know

7.01

The diagram shows several line segments and a point. The point is located at the center of the circle.



a Trace all the segments that are diameters.

b Explain how you know a segment is a diameter.

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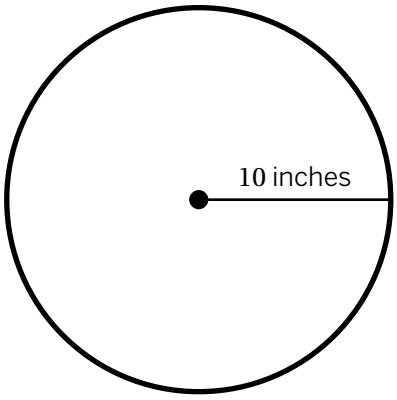
Name: Date: Period:

Show What You Know

7.02

What is the circumference of this circle?



Explain your thinking.

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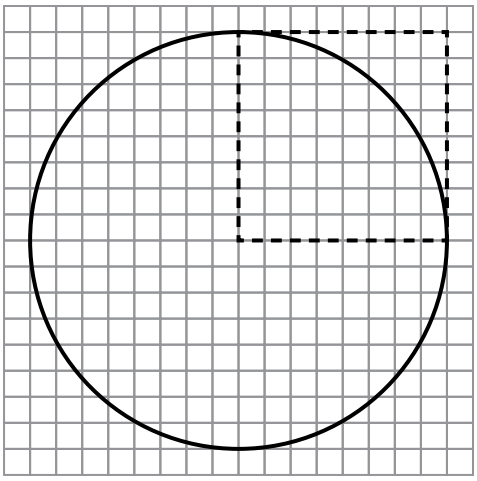
Name: Date: Period:

Show What You Know

7.03

Here is a circle and one of its radius squares.



a About how many radius squares does it take to cover the circle?

b Estimate the area of the circle. Show your thinking.

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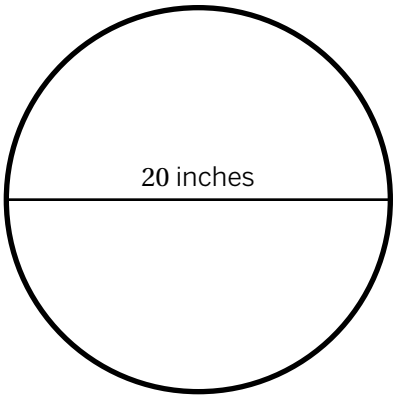
Name: Date: Period:

Show What You Know

7.04

What is the exact area of this circle?



Show or explain your thinking.

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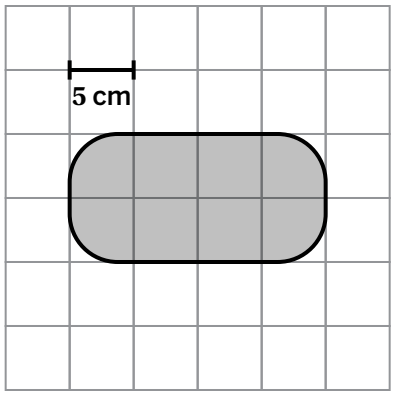
Name: Date: Period:

Show What You Know

7.05

Determine the area of this shape.



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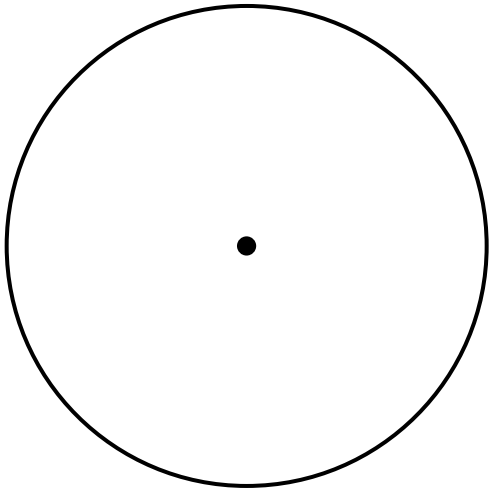
Name: Date: Period:

Show What You Know

7.06

The circumference of this circle is 60 feet.

What is the circle's area? Show or explain your thinking.



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Name: Date: Period:

Show What You Know

7.07

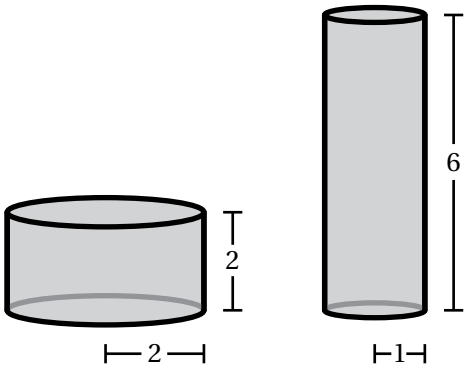
Which cylinder has the greater volume?

A. Short cylinder

B. Tall cylinder

C. They have the same volume.

Explain your thinking.



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Name: Date: Period:

Show What You Know

7.08

Which of the following best describes this graph?

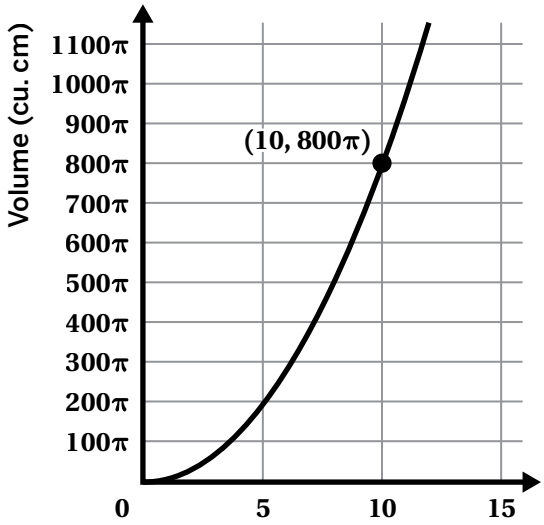
A. Heights and volumes of cylinders with an 8 cm radius

B. Heights and volumes of cylinders with a 4 cm radius

C. Radii and volumes of cylinders with an 8 cm height

D. Radii and volumes of cylinders with a 4 cm height

Explain your thinking.



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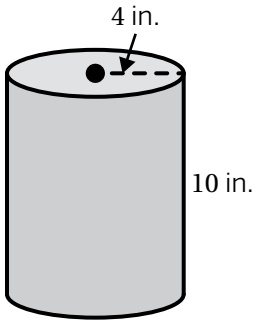
Name: Date: Period:

Show What You Know

7.09

Calculate the exact and approximate surface area of the cylinder below. Use 3.14 for π.



Explain your thinking.

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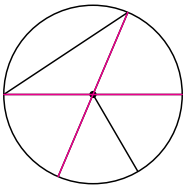
Show What You Know **Lesson 1**

Name: _____ Date: _____ Period: _____

Show What You Know 7.01

The diagram shows several line segments and a point. The point is located at the center of the circle.



a. Trace all the segments that are diameters.
Response shown on diagram.

b. Explain how you know a segment is a diameter.
Responses vary. **A segment is a diameter if it goes from one point on a circle to another point on the circle and passes through the center.**

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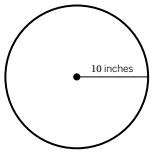
Show What You Know **Lesson 2**

Name: _____ Date: _____ Period: _____

Show What You Know 7.02

What is the circumference of this circle?
Responses vary as students may use π, 3.14, **or** $\frac{22}{7}$ ***in their calculations.***
- 20π **inches**
- 62.8 **inches**
- $\frac{440}{7}$ **inches**



Explain your thinking.
Explanations vary. **The radius of the circle is 10 inches, so the diameter is twice that value, or 20 inches. To find the circumference, I can multiply the diameter by** π.

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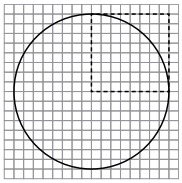
Show What You Know **Lesson 3**

Name: _____ Date: _____ Period: _____

Show What You Know 7.03

Here is a circle and one of its radius squares.



a. About how many radius squares does it take to cover the circle?
Responses vary. **About 3 radius squares.**

b. Estimate the area of the circle.
Show your thinking.
Responses and work vary. **About 192 square units.**
$8 \cdot 8 = 64$
$3 \cdot 64 = 192$

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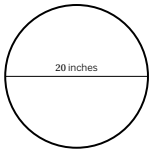
Show What You Know **Lesson 4**

Name: _____ Date: _____ Period: _____

Show What You Know 7.04

What is the exact area of this circle?
100π **square inches**



Show or explain your thinking.
Responses vary.
$r = 20 \div 2 = 10$ **inches**
$A = \pi \cdot 10^2 = 100\pi$ **square inches**

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Show What You Know **Lesson 5**

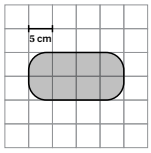
Name: _____ Date: _____ Period: _____

Show What You Know 7.05

Determine the area of this shape.

Responses vary as students may use π, 3.14, or $\frac{22}{7}$ in their calculations.

- $25\pi + 100$ square centimeters
- $\frac{1250}{7}$ square centimeters
- 178.5 square centimeters



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Show What You Know **Lesson 6**

Name: _____ Date: _____ Period: _____

Show What You Know 7.06

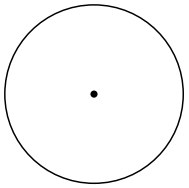
The circumference of this circle is 60 feet.

What is the circle's area? Show or explain your thinking.

Responses vary as students may use π, 3.14, or $\frac{22}{7}$ in their calculations.

- $\frac{900}{\pi}$ (or equivalent) square feet
- 286.62 square feet
- $\frac{3150}{11}$ square feet

Explanations vary. I can divide 60 by 2π to get the radius of the circle. Then, I can square the radius and multiply by π to get the area: $\left(\frac{60}{2\pi}\right)^2 \cdot \pi$



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Show What You Know **Lesson 7**

Name: _____ Date: _____ Period: _____

Show What You Know 7.07

Which cylinder has the greater volume?

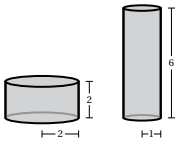
A. Short cylinder

B. Tall cylinder

C. They have the same volume.

Explain your thinking.

Explanations vary. The volume of the short cylinder is $V = \pi \cdot (2)^2 \cdot 2 = 8\pi$. The volume of the tall cylinder is $V = \pi \cdot (1)^2 \cdot 6 = 6\pi$. So the short cylinder has the greater volume.



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Show What You Know **Lesson 8**

Name: _____ Date: _____ Period: _____

Show What You Know 7.08

Which of the following best describes this graph?

A. Heights and volumes of cylinders with an 8 cm radius

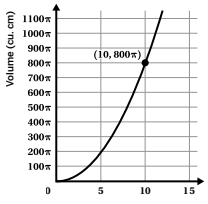
B. Heights and volumes of cylinders with a 4 cm radius

C. Radii and volumes of cylinders with an 8 cm height

D. Radii and volumes of cylinders with a 4 cm height

Explain your thinking.

Explanations vary. The relationship between height and volume is linear, and this graph is not linear, so I knew it had to show the relationship between radius and volume. I noticed that the point $(10, 800\pi)$ was on the curve. That could represent a cylinder that has a radius of 10 and a height of 8, so I concluded that the graph was all cylinders with a height of 8 centimeters.



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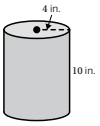
Show What You Know **Lesson 9**

Name: _____ Date: _____ Period: _____

Show What You Know 7.09

Calculate the exact and approximate surface area of the cylinder below. Use 3.14 for π.



Explain your thinking.

Exactly 160π square inches or approximately 502.4 square inches.
I used the formula $SA = 2\pi rh + 2\pi r^2 = 2\pi(4)(10) + 2\pi(4)^2 = 112\pi \approx 351.9$ sq.in.

Accelerated 7 307

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Unit 8
Assessments and Rubrics

Name: ..... Date: ..... Period: .....

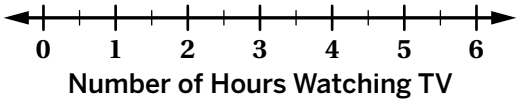
Pre-Unit Check

Unit 8

1. A survey asked 10 people how many hours they spent watching TV last night. Here are their responses.

0	4.5	2	3	2	2.5	3	0	2	4

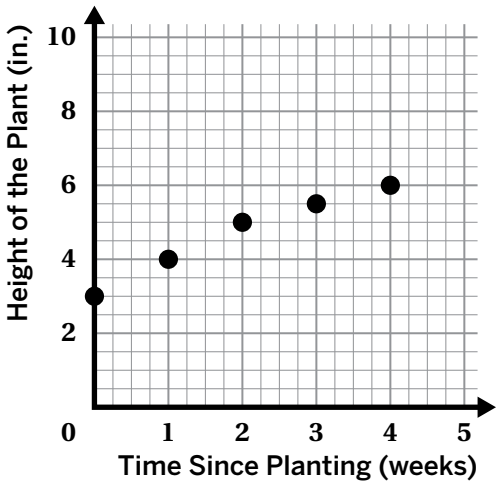
Create a dot plot of their responses.



2. Dakota measured the height of a plant each week since planting it.

What was the height of the plant 4 weeks after Dakota planted it?

Explain your thinking.



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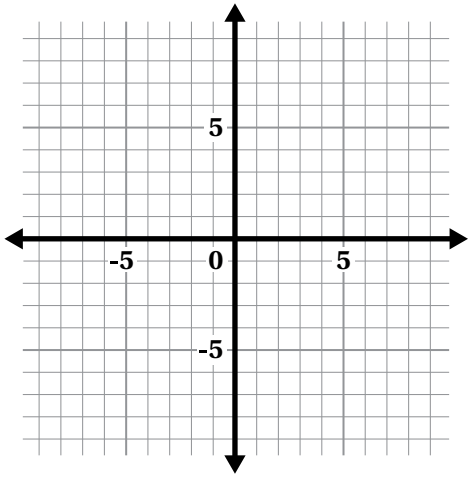
Pre-Unit Check (continued)

Unit 8

3. A line contains the points (-3, -2) and (7, 2). Use the coordinate plane if it helps with your thinking.

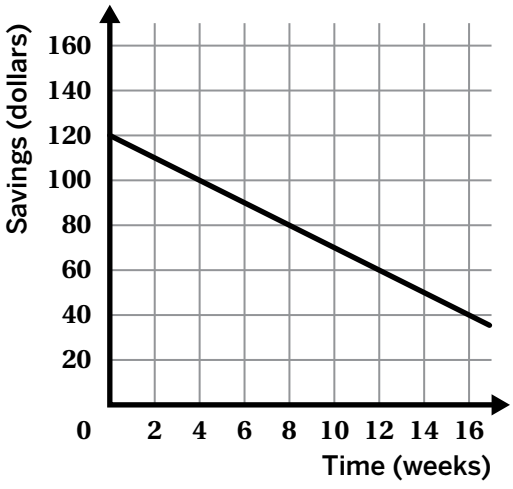


a Is the slope of this line positive or negative?

Explain your thinking.

b Calculate the slope of the line.

4. Here is a graph showing the amount in someone's savings account since the beginning of the year.



a Write an equation for the line shown on the graph.

b What does the slope represent in this situation?

c What does the vertical intercept represent in this situation?

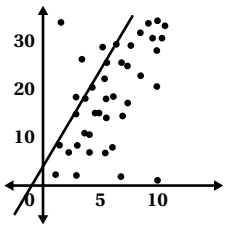
Name: ..... Date: ..... Period: .....

Sub-Unit Quiz

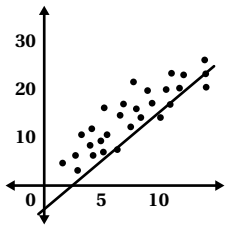
Unit 8

1. Select the scatter plot with the best line of fit.

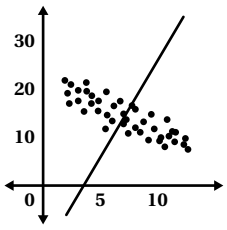
A.



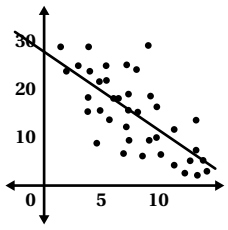
B.



C.



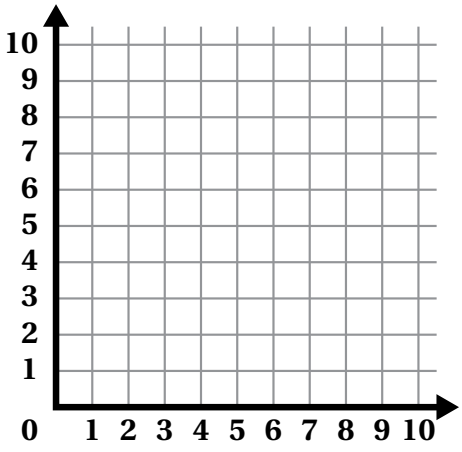
D.



2. Draw two scatter plots.

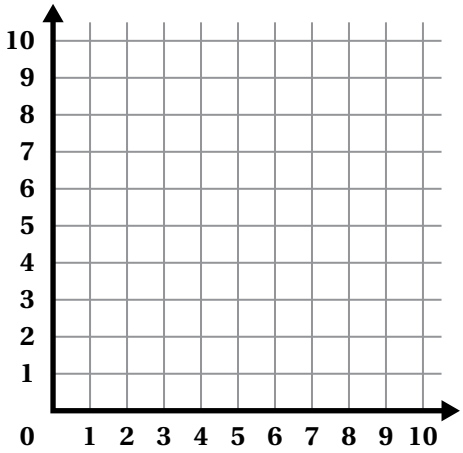
a For this scatter plot, include:

- At least ten points.
- A positive **strong** linear association.

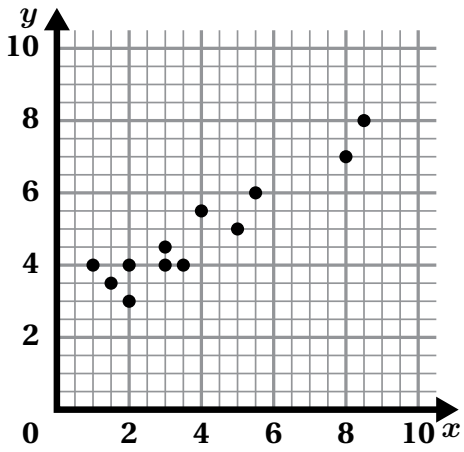


b For this scatter plot, include:

- At least ten points.
- A **negative weak** nonlinear association.

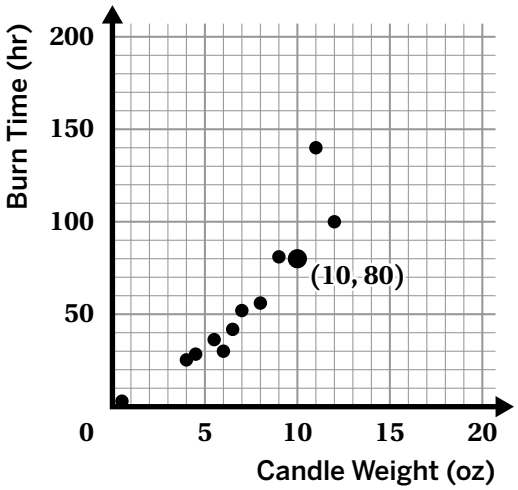


3. Draw a line on the scatter plot to fit the data.



Sub-Unit Quiz (continued)

4. This graph shows the weight of several candles and the time it takes for them to fully burn.



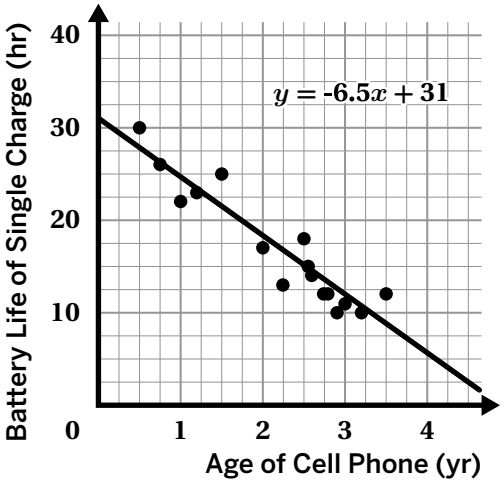
a Describe what the point $(10, 80)$ represents.

b Circle a point that could represent an outlier.

c Plot a new point on the graph that represents this description:

The heaviest candle that takes less than 100 *hours to burn.*

5. This scatter plot shows the age of used cell phones and their battery life on a single charge.



a What is the value of the slope? What does it mean in this situation?

b There is a cell phone that is 4 years old. Use the linear model to predict its battery life on a single charge.

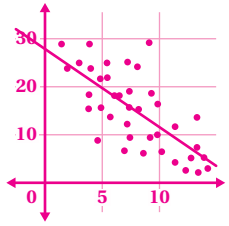
6. Choose an appropriate display for the situation. Explain your reasoning.

The favorite type of movie of students in your class

Standard	MA.7.DP.1.5	MA.8.DP.1.1	MA.8.DP.1.2	MA.8.DP.1.3	MA.8.AR.3.5
Problem(s)	6	2, 4c	4a, 4b	1, 3, 5a, 5b	5b

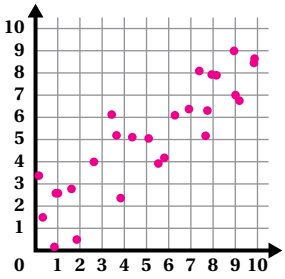
Problem 1

Standard: MA.8.DP.1.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice:  			**Incorrect** choice.

Problem 2a

Standard: MA.8.DP.1.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: *Responses vary.*  	Response shows **conceptual understanding** with minor errors. E.g., Response correctly meets two constraints.	Response shows **incomplete understanding** with significant errors. E.g., Response correctly meets one constraint.	Response shows **limited understanding**.

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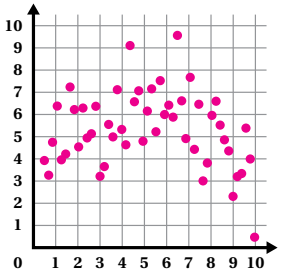
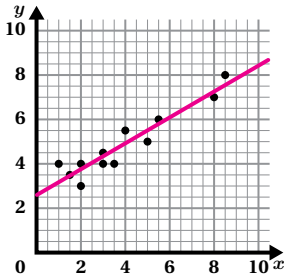
Problem 2b

Standard: MA.8.DP.1.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: *Responses vary.* 	Response shows **conceptual understanding** with minor errors. E.g., Response correctly meets two constraints.	Response shows **incomplete understanding** with significant errors. E.g., Response correctly meets one constraint.	Response shows **limited understanding**.

Problem 3

Standard: MA.8.DP.1.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: *Responses vary.* 	Response shows **conceptual understanding** with minor errors. E.g., Response includes a positive slope but does not pass through the center of the data.	Response shows **incomplete understanding** with significant errors. E.g., Response includes a line but it is not a good fit for the data.	Response shows **limited understanding**.

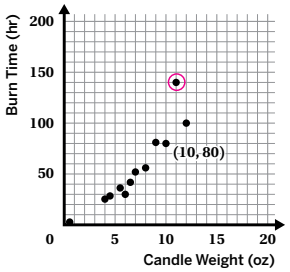
Problem 4a

Standard: MA.8.DP.1.2

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: *Responses vary.* A 10-ounce candle takes 80 hours to fully burn.	Response shows **conceptual understanding** with minor errors. E.g., Response correctly describes one quantity.	Response shows **incomplete understanding** with significant errors. E.g., Students who write "An 80-ounce candle takes 10 hours to fully burn" may have confused the axes.	Response shows **limited understanding**.

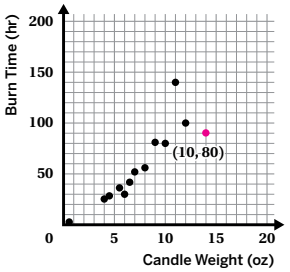
Problem 4b

Standard: MA.8.DP.1.2

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response:  	Response shows **conceptual understanding** with minor errors. E.g., Response includes $(11, 140)$ and another point is circled.	Response shows **incomplete understanding** with significant errors. E.g., Student circles the left-most point that is separated from the data but is not an outlier.	Response shows **limited understanding**.

Problem 4c

Standard: MA.8.DP.1.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response:  	Response shows **conceptual understanding** with minor errors. E.g., Response includes an x-coordinate greater than 12 or a y-coordinate less than 100.	Response shows **incomplete understanding** with significant errors. E.g., Response includes an x-coordinate equal to 12 and a y-coordinate equal to 100.	Response shows **limited understanding**.

Problem 5a

Standards: MA.8.DP.1.3, MA.8.AR.3.5, MTR.6.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. **-6.5. *Explanations vary.* This means that when the age of a cell phone increases by 1, the battery life on a single charge is expected to decrease by 6.5 hours.**	**Correct** response with **minor flaws** in **explanation**. E.g., Response includes "the battery life goes down by 6.5" but does not specify the change in the age of the phone. **Incorrect** response with logical and **complete explanation**.	**Correct** response with **incomplete explanation**. **Incorrect** response with explanation that shows **partial understanding**. E.g., Response includes "the battery life decreases by 1 hour for every 6.5 years old the phone is."	**Incorrect** response with **no explanation**.

Problem 5b			Standards: MA.8.DP.1.3, MTR.6.1
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response: **5 hours**	Response shows **conceptual understanding** with minor errors. E.g., Response includes an attempt to correctly substitute 4 for x in the equation but then has a minor calculation error.	Response shows **incomplete understanding** with significant errors. E.g., Students who write 4.15 may have substituted 4 for y in the equation and then solved for x.	Response shows **limited understanding**.

Problem 6			Standard: MA.7.DP.1.5
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response and **complete** explanation. **Bar chart or circle graph. *Explanations vary*. Both displays show data in categories either as a number or as a percent.**	**Correct** response with **minor flaws** in **explanation**. E.g., Response includes "bar chart" or "circle graph" but does not specify how the data in categories is expressed. **Incorrect** response with logical and **complete explanation.**	**Correct** response with **incomplete explanation**. E.g., Response includes "bar chart" or "circle graph" but does not specify that the display shows data in categories. **Incorrect** response with explanation that shows **partial understanding**.	Incorrect response with **no explanation**.

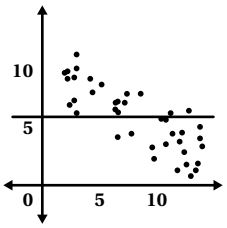
Name: ..... Date: ..... Period: .....

End-of-Unit Assessment

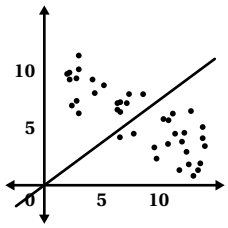
Unit 8

1. Select the scatter plot with the best line of fit.

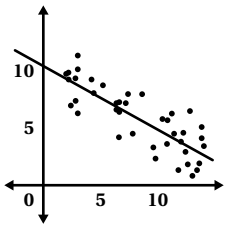
A.



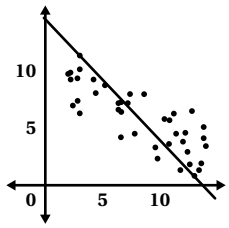
B.



C.



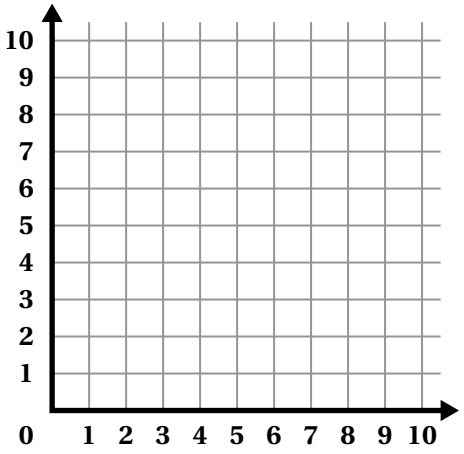
D.



2. Draw two scatter plots.

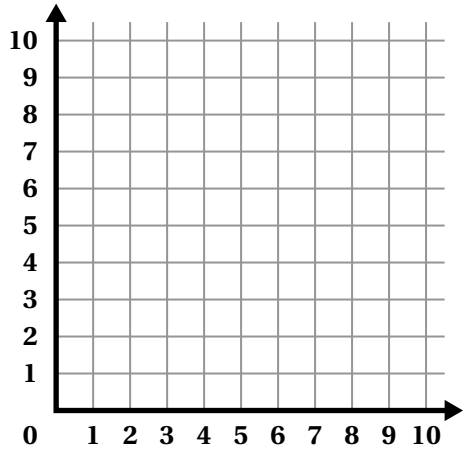
a For this scatter plot, include:

- At least six points.
- A positive strong linear association.
- One obvious outlier.



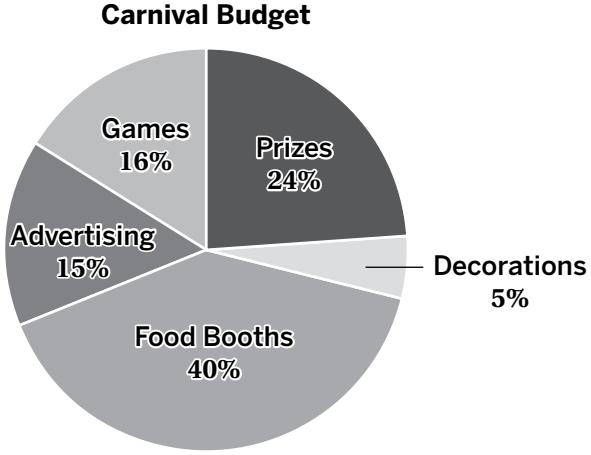
b For this scatter plot, include:

- At least six points.
- A negative strong nonlinear association.



3. Use the circle graph.

An events coordinator has a budget of $800 to set up a carnival. How much of that money is spent on prizes? Show or explain your reasoning.



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End-of-Unit Assessment (continued)

Unit 8

4. Select *all* the pairs of variables that have a *positive* association.

- ☐ **A.** x: Outside temperature
  y: Cost to heat a home
- ☐ **B.** x: Number of people in a checkout line
  y: Time you have to wait to check out
- ☐ **C.** x: Minutes you've walked
  y: Number of steps you've walked
- ☐ **D.** x: Speed of a train
  y: Time for the train to get to its destination
- ☐ **E.** x: Pounds of cherries you buy
  y: Total cost of the cherries

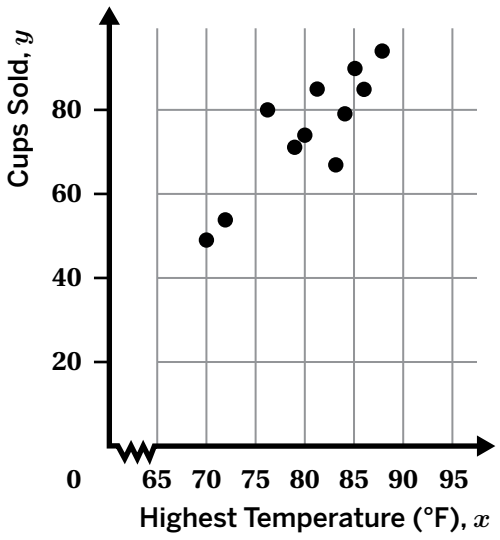
5. Jayla opened a lemonade stand in the summer. She noticed that she sold more lemonade on warmer days. For each day she sold lemonade, she plotted the day's highest temperature and the cups of lemonade she sold.

a Sketch a linear model that is a good fit for the data.

b Jayla made a linear model with the equation $y = 2x - 89$.

Use her equation to predict how many cups of lemonade she would sell on a day where the highest temperature is $74°$F.

c Identify the slope of Jayla's model and describe what it means in this situation.



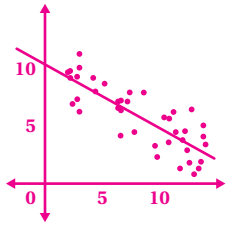
6. Choose an appropriate display for the situation. Explain your reasoning.

The points scored by each player on a volleyball team

Standard	MA.7.DP.1.4	MA.7.DP.1.5	MA.8.AR.3.5	MA.8.DP.1.2	MA.8.DP.1.3
Problem(s)	3	6	5c	2, 4	1, 5a, 5b, 5c

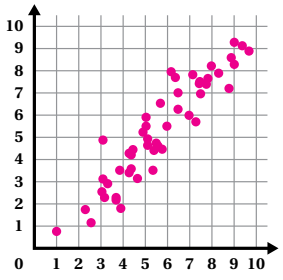
Problem 1

Standard: MA.8.DP.1.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice:  			**Incorrect** choice.

Problem 2a

Standards: MA.8.DP.1.2, MTR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: *Responses vary.*  	Response shows **conceptual understanding** with minor errors. E.g., Students who plot at least five points that have a linear association and one point not near the line but with a negative slope may not understand positive and negative associations. E.g., Students who plot at least six points that have a linear association with a positive slope but do not include an outlier may not understand outliers.	Response shows **incomplete understanding** with significant errors. E.g., Students who plot a negative association without outliers may need additional support with this unit's vocabulary.	Response shows **limited understanding**.

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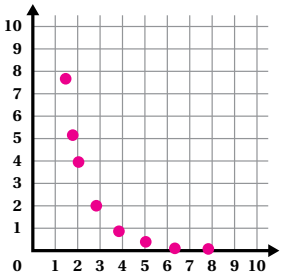
Problem 2b

Standards: MA.8.DP.1.2, MTR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: *Responses vary.*  	Response shows **conceptual understanding** with minor errors. E.g., Students who plot at least six points that have a non-linear association but with a positive trend may not understand positive and negative associations.	Response shows **incomplete understanding** with significant errors. E.g., Students who plot a linear negative association may need additional support understanding the difference between linear and non-linear associations.	Response shows **limited understanding**. E.g., Students who plot a positive linear association.

Problem 3

Standard: MA.7.DP.1.4

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. **\$192 is spent on prizes.** $.24(800) = \$192$	**Correct** response with **minor flaws** in **explanation**. **Incorrect** response with logical and **complete explanation**. E.g, Students may have correctly known to multiply $.24$ by 800 but then made a minor calculation error.	**Correct** response with **incomplete explanation**. **Incorrect** response with explanation that shows **partial understanding**. E.g, Students may not have converted the percent before multiplying and/or used the incorrect category's percent.	**Incorrect** response with **no explanation**.

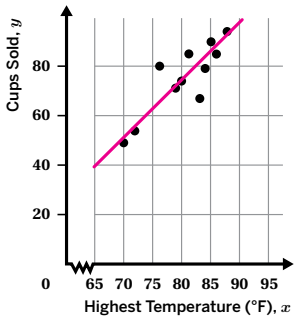
Problem 4

Standard: MA.8.DP.1.2

4 Meeting	3 Approaching	2 Developing	1 Beginning
All correct choices and **no incorrect** choices. • x: Number of people in a checkout line y: Time you have to wait to check out • x: Minutes you've walked y: Number of steps you've walked • x: Pounds of cherries you buy y: Total cost of the cherries	**One or two correct** choices and **no incorrect** choices. **All correct** choices and **one incorrect** choice.	**One or two correct** choices and **one incorrect** choice.	**Only incorrect** choices. **Two or more incorrect** choices with **some correct** choices.

Problem 5a

Standard: MA.8.DP.1.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: *Responses vary.*  	Response shows **conceptual understanding** with minor errors. E.g., The slope of the line generally follows the trend of the data but is shifted vertically.	Response shows **incomplete understanding** with significant errors. E.g., The line goes through the center of the data but does not fit the trend of the data.	Response shows **limited understanding**.

Problem 5b

Standard: MA.8.DP.1.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: 59 cups	Response shows **conceptual understanding** with minor errors. E.g, Students may have correctly substituted 74 for x in the equation but then made a minor calculation error.	Response shows **incomplete understanding** with significant errors. E.g, Students who write 81.5 cups may have substituted 74 for y in the equation and then solved for x.	Response shows **limited understanding**.

Problem 5c

Standards: MA.8.DP.1.3, MA.8.AR.3.5

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. 2. *Responses vary.* This means that the model predicts 2 more cups of lemonade sold for every 1-degree increase in temperature.	**Correct** response with **minor flaws in explanation**. E.g., Response includes "2 more cups of lemonade are sold" but does not specify the 1-degree increase in temperature. **Incorrect** response with logical and **complete explanation**.	**Correct** response with **incomplete explanation**. **Incorrect** response with explanation that shows **partial understanding**. E.g., Response includes "For every 2-degree increase in temperature 1 more cup of lemonade is sold."	**Incorrect** response with **no explanation**.

Problem 6			Standard: MA.7.DP.1.5
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response and **complete** explanation. **Line plot or stem-and-leaf plot. *Explanations vary*. Both displays show individual data values.**	**Correct** response with **minor flaws** in **explanation**. E.g., Response includes "line plot" or "stem-and-leaf plot" and "data grouped by categories" but does not specify that the display shows individual data values. **Incorrect** response with logical and **complete explanation**.	**Correct** response with **incomplete explanation**. E.g., Response includes "line plot" or "stem-and-leaf plot" but does not specify that the display shows individual data values. **Incorrect** response with explanation that shows **partial understanding**.	**Incorrect** response with **no explanation**.

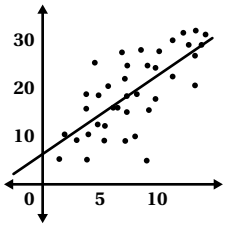
Name: ..... Date: ..... Period: .....

End-of-Unit Assessment

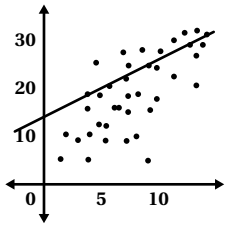
Unit 8

1. Select the scatter plot with the best line of fit.

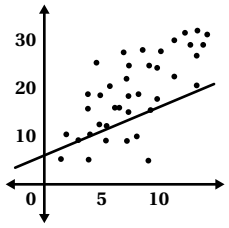
A.



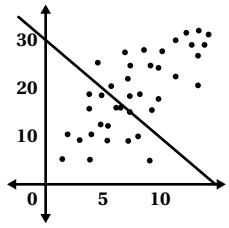
B.



C.



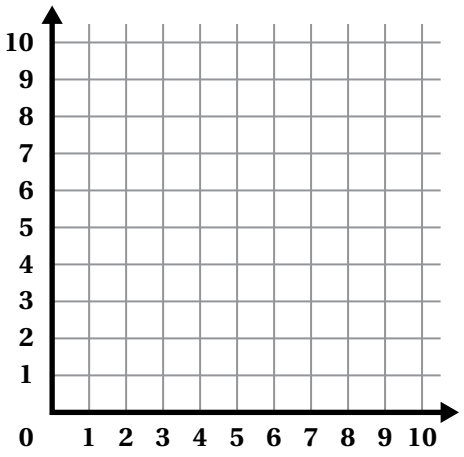
D.



2. Draw two scatter plots.

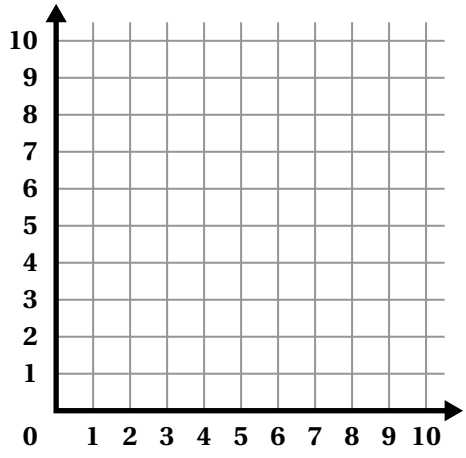
a For this scatter plot, include:

- At least six points.
- A negative strong linear association.
- One obvious outlier.



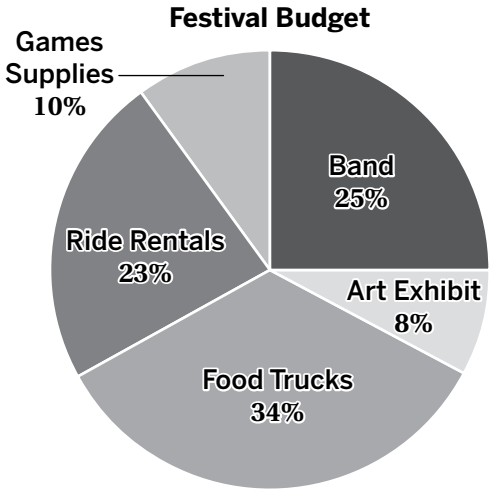
b For this scatter plot, include:

- At least six points.
- A positive strong nonlinear association.



3. Use the circle graph.

An events coordinator has a budget of $940 to set up a festival. How much of that money is spent on a band? Show or explain your reasoning.



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End-of-Unit Assessment (continued)

Unit 8

4. Select *all* the pairs of variables that have a *negative* association.

- ☐ **A.** x: Minutes you've walked
  y: Number of calories burned
- ☐ **B.** x: Money in a bank account
  y: Money spent from the bank account
- ☐ **C.** x: Number of people in a checkout line
  y: Time you have to wait in the line
- ☐ **D.** x: Time working
  y: Free time
- ☐ **E.** x: Speed that you walk
  y: Time to get to your destination

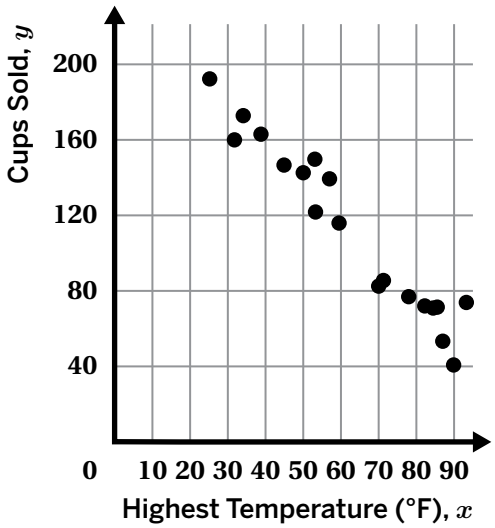
5. Pilar opened a hot chocolate store in the fall. She noticed that she sold more hot chocolate on colder days. For each day she sold hot chocolate, she plotted the day's highest temperature and the cups of hot chocolate she sold.

a Sketch a linear model that is a good fit for the data.

b Pilar made a linear model with the equation $y = -2x + 240$.

Use her equation to predict how many cups of hot chocolate Pilar might sell on a day when the highest temperature is 40°F.

c Identify the slope of Pilar's model and describe what it means in this situation.



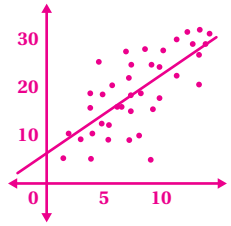
6. Choose an appropriate display for the situation. Explain your reasoning.

The median number of books read by students in the reading challenge

Standard	MA.7.DP.1.4	MA.7.DP.1.5	MA.8.AR.3.5	MA.8.DP.1.2	MA.8.DP.1.3
Problem(s)	3	6	5c	2, 4	1, 5a, 5b, 5c

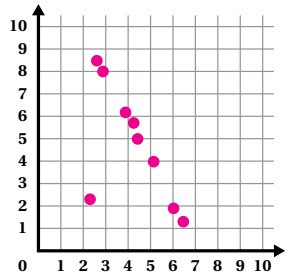
Problem 1

Standard: MA.8.DP.1.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice:  			**Incorrect** choice.

Problem 2a

Standards: MA.8.DP.1.2, MTR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: *Responses vary.*  	Response shows **conceptual understanding** with minor errors. E.g., Students who plot at least five points that have a linear association but with a positive slope may not understand positive and negative associations. E.g., Students who plot at least six points that have a linear association with a negative slope but do not include an outlier may not understand outliers.	Response shows **incomplete understanding** with significant errors. E.g., Students who plot a positive association without outliers may need additional support with this unit's vocabulary.	Response shows **limited understanding**.

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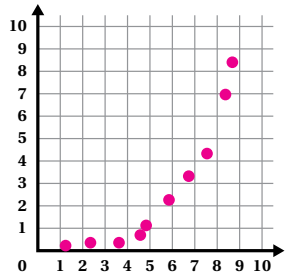
Problem 2b

Standards: MA.8.DP.1.2, MTR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: *Responses vary.*  	Response shows **conceptual understanding** with minor errors. E.g., Students who plot at least six points that have a non-linear association, but with a negative trend may not understand positive and negative associations.	Response shows **incomplete understanding** with significant errors. E.g., Students who plot a linear positive association may need additional support understanding the difference between linear and non-linear associations.	Response shows **limited understanding**. E.g., Students who plot a negative linear association.

Problem 3

Standard:MA.7.DP.1.4

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. **$235 is spent on a band.** **$.25(940) = \$235$**	**Correct** response with **minor flaws** in **explanation**. **Incorrect** response with logical and **complete explanation**. E.g, Students may have correctly known to multiply $.25$ by 940 but then made a minor calculation error.	**Correct** response with **incomplete explanation**. **Incorrect** response with explanation that shows **partial understanding**. E.g, Students may not have converted the percent before multiplying and/or used the incorrect category's percent.	**Incorrect** response with **no explanation**.

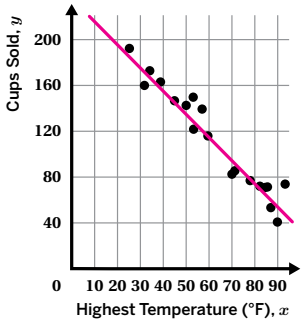
Problem 4

Standard: MA.8.DP.1.2

4 Meeting	3 Approaching	2 Developing	1 Beginning
All correct choices and **no incorrect** choices. • **x: Money in a bank account** **y: Money spent from the bank account** • **x: Time working** **y: Free time** • **x: Speed that you walk** **y: Time to get to your destination**	**One or two correct** choices and **no incorrect** choices. **All correct** choices and **one incorrect** choice.	**One or two correct** choices and **one incorrect** choice.	**Only incorrect** choices. **Two or more incorrect** choices with **some correct** choices.

Problem 5a

Standard: MA.8.DP.1.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: *Responses vary.*  	Response shows **conceptual understanding** with minor errors. E.g., The slope of the line generally follows the trend of the data but is shifted vertically.	Response shows **incomplete understanding** with significant errors. E.g., The line goes through the center of the data but does not fit the trend of the data.	Response shows **limited understanding**.

Problem 5b

Standard: MA.8.DP.1.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: 160 cups	Response shows **conceptual understanding** with minor errors. E.g, Students may have correctly substituted 40 for x in the equation but then made a minor calculation error.	Response shows **incomplete understanding** with significant errors. E.g, Students who write 100 cups may have substituted 40 for y in the equation and then solved for x.	Response shows **limited understanding**.

Problem 5c

Standards: MA.8.DP.1.3, MA.8.AR.3.5

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete explanation**. *-2. Responses vary. This means that for every 1-degree increase in temperature, the model predicts that Pilar will sell 2 fewer cups of hot chocolate.*	**Correct** response with **minor flaws in explanation**. E.g., Response includes "2 fewer cups of hot chocolate are sold" but does not specify the 1-degree increase in temperature. **Incorrect** response with logical and **complete explanation**. E.g., a student writes 2 for the slope.	**Correct** response with **incomplete explanation**. **Incorrect** response with **explanation** that shows **partial understanding**. E.g., Response includes "For every 2-degree increase in temperature, 1 fewer cups of hot chocolate is sold."	**Incorrect** response with **no explanation**.

Problem 6			Standard: MA.7.DP.1.5
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response and **complete** explanation. **Box plot. *Explanations vary.* A box plot shows five statistics, which includes the median.**	**Correct** response with **minor flaws** in **explanation**. E.g., Response includes "box plot" and "shows the spread of the data", but does not specify that the box plot shows five statistics. **Incorrect** response with logical and **complete explanation**.	**Correct** response with **incomplete explanation**. E.g., Response includes "box plot" but does not specify that the box plot shows five statistics, which includes the median. **Incorrect** response with explanation that shows **partial understanding.**	**Incorrect** response with **no explanation**.

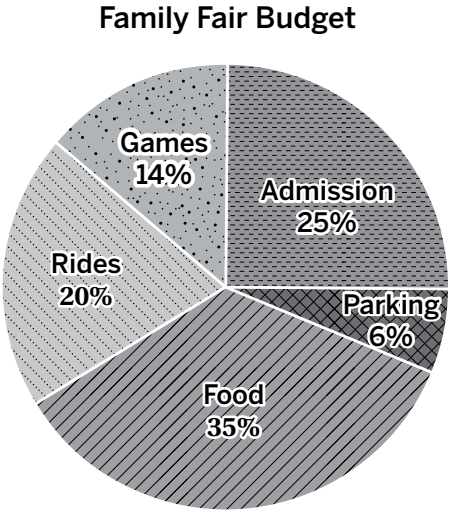
Unit 8
Show What You Know PDFs

Name: Date: Period:

Show What You Know

8.01

Use the circle graph below.



Suppose your family spends $180 dollars at the county fair. How much of that money is spent on food? Show or explain your reasoning.

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Name: Date: Period:

Show What You Know

8.02

Choose an appropriate display for each situation. Explain your reasoning.

1. The favorite type of music of students in your grade

2. The median amount of money raised by each student during a charity campaign

3. The points scored by each player on a basketball team

4. Choose *all* the situations that would best be displayed in a line plot.

- ☐ **A.** favorite type of television show
- ☐ **B.** heights of tallest buildings in the world
- ☐ **C.** ages of students in a chess club
- ☐ **D.** number of students on a swim team
- ☐ **E.** percent of students in favor of, against, or neutral regarding a new class mascot

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Name: Date: Period:

Show What You Know

8.03

The data shows the ages of 30 students who are participating in a school play.

9, 9, 9, 9, 9, 9, 10, 10, 10, 10, 10, 10, 10, 10, 10, 10, 10, 11, 11, 11, 11, 12, 12, 12, 12, 12, 12, 12, 12, 13

a. Create an appropriate display for the data.

b. Explain how your display might be used to answer questions.

c. Calculate the mean and median age of students who are participating in the school play.

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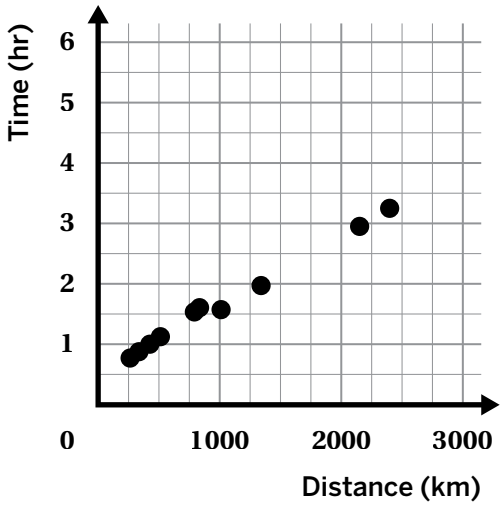
Name: Date: Period:

Show What You Know

8.04

This scatter plot shows the distance and time for 10 flights.

Based on this data, about how long will a 2,000-kilometer flight take?



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Name: Date: Period:

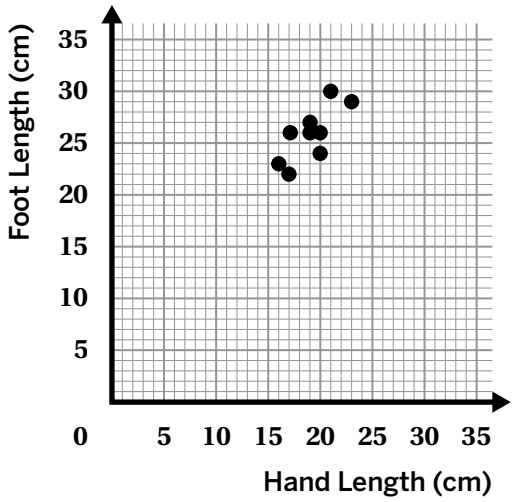
Show What You Know

8.05

The scatter plot shows measurements of hand and foot lengths for 9 students.

Plot the point to represent one more student's measurements.

Hand Length (cm)	Foot Length (cm)
16	21



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Name: Date: Period:

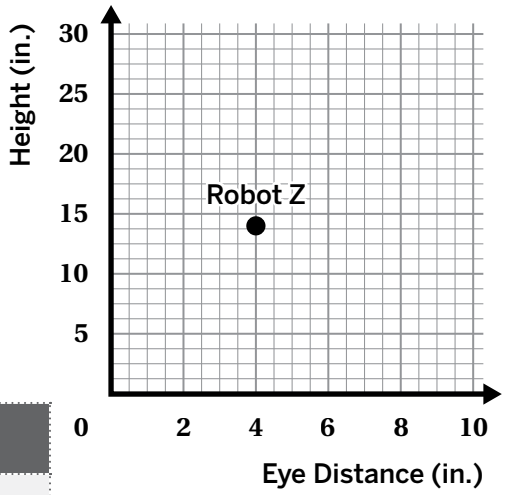
Show What You Know

8.06

The table shows the height and eye distance for Robot W.

a Plot a point to represent Robot W.

b Complete the table with Robot Z's eye distance and height.



Robot	Eye Distance (in.)	Height (in.)
W	8	20
Z		

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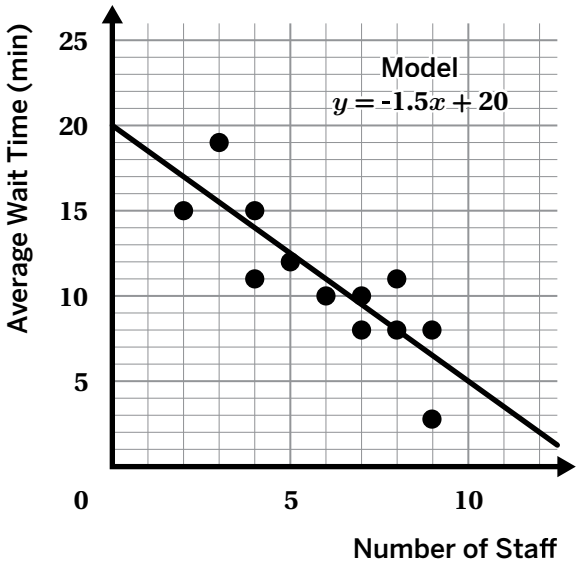
Name: Date: Period:

Show What You Know

8.07

This scatter plot shows the average wait times for customers and the number of staff members at 12 fast food restaurants.

What does the linear model predict the wait time will be for a fast food restaurant with 10 staff members?



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Name: Date: Period:

Show What You Know

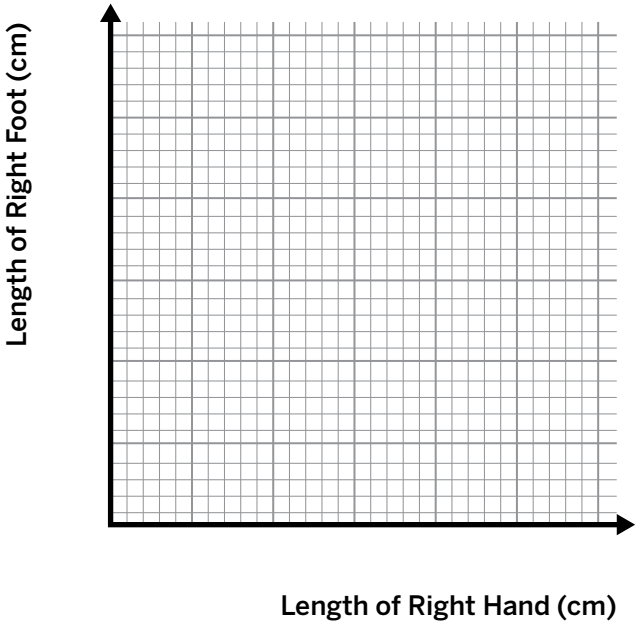
8.08

The table shows the lengths, in centimeters, of the right hand and right foot of five different people.

	Length of Right Hand (cm)	Length of Right Foot (cm)
Andre	19	27
Clare	21	30
Diego	17	23
Han	18	24
Mai	19	26

a Create a scale for the graph so that it fits all of the data.

b Create a scatter plot of the data.



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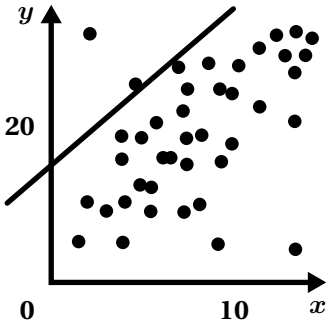
Name: Date: Period:

Show What You Know

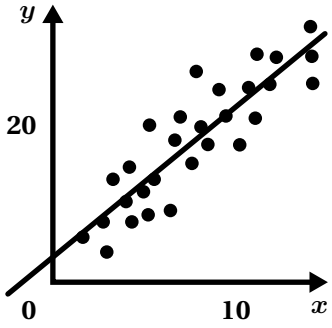
8.09

Which scatter plot has the best line of fit?

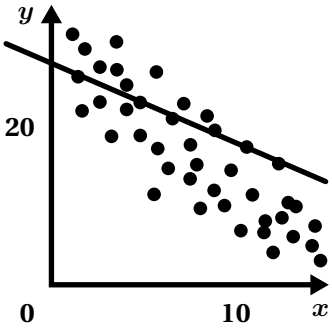
A.



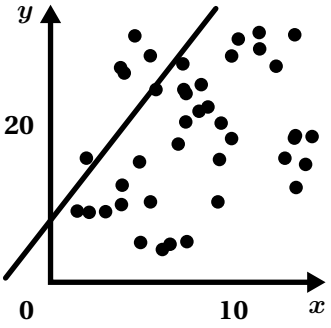
B.



C.



D.



Explain your thinking.

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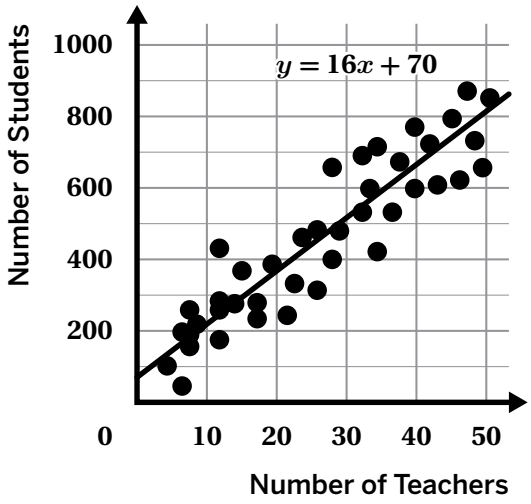
Name: Date: Period:

Show What You Know

8.10

This scatter plot shows the number of teachers and students in 40 schools, along with a linear model for the data.



a What type of association is there between the number of teachers and students?

- **A.** Positive weak association
- **B.** Positive strong association
- **C.** Negative weak association
- **D.** Negative strong association
- **E.** No association

b Identify the slope of the model and describe what it means in this situation.

The slope of the model is . . .

This means . . .

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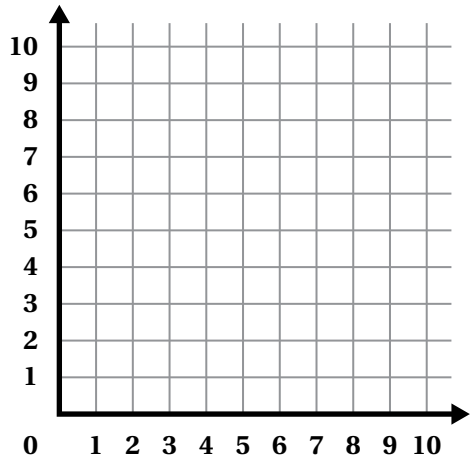
Name: Date: Period:

Show What You Know

8.11

Create a scatter plot that has a strong positive linear association, with clusters.



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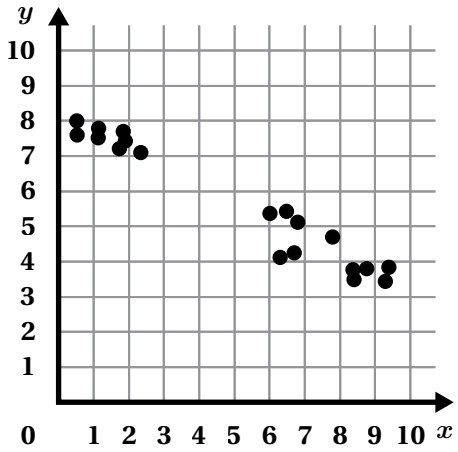
Name: Date: Period:

Show What You Know

8.12

a Sketch a line on the scatter plot to fit the data.

b Use your line of fit to predict the y-value of a new data point whose x-value is 4.



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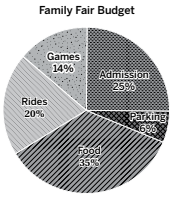
Show What You Know **Lesson 1**

Name: _____ Date: _____ Period: _____

Show What You Know 8.01

Use the circle graph below.



Suppose your family spends $180 dollars at the county fair. How much of that money is spent on food? Show or explain your reasoning.

$63 was spent on food. .35(180) = $63

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Show What You Know **Lesson 2**

Name: _____ Date: _____ Period: _____

Show What You Know 8.02

Choose an appropriate display for each situation. Explain your reasoning.

1. The favorite type of music of students in your grade

   Bar chart or circle graph. *Explanations vary.* Both displays show data in categories either as a number or as a percent.

2. The median amount of money raised by each student during a charity campaign

   Box plot. *Explanations vary.* A box plot shows five statistics, which includes the median.

3. The points scored by each player on a basketball team

   Line plot or stem-and-leaf plot. *Explanations vary.* Both displays show individual data values.

4. Choose *all* the situations that would best be displayed in a line plot.

   - ☐ A. favorite type of television show
   - ☑ B. heights of tallest buildings in the world
   - ☑ C. ages of students in a chess club
   - ☑ D. number of students on a swim team
   - ☐ E. percent of students in favor of, against, or neutral regarding a new class mascot

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Show What You Know **Lesson 3**

Name: _____ Date: _____ Period: _____

Show What You Know 8.03

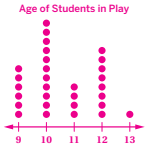
The data shows the ages of 30 students who are participating in a school play.

9, 9, 9, 9, 9, 10, 10, 10, 10, 10, 10, 10, 10, 10, 10, 11, 11, 11, 11, 12, 12, 12, 12, 12, 12, 12, 12, 13

a. Create an appropriate display for the data.

b. Explain how your display might be used to answer questions.

c. Calculate the mean and median age of students who are participating in the school play.



***Responses vary.* A line plot is an appropriate display because the data values can be shown with dots that are placed vertically above the numbers. Each dot represents a data value. You can use the display to see how many students of each age participated in the play and make comparisons between ages.**

The mean age of students participating in the school play is 10.6 and the median age is 10.

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Show What You Know **Lesson 4**

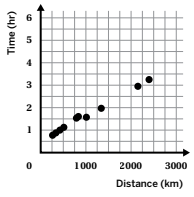
Name: _____ Date: _____ Period: _____

Show What You Know 8.04

This scatter plot shows the distance and time for 10 flights.

Based on this data, about how long will a 2,000-kilometer flight take?

Responses between 2.5 and 3 hours are considered correct.



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Show What You Know **Lesson 5**

Name: _____ Date: _____ Period: _____

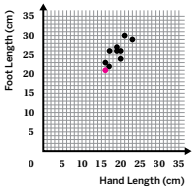
Show What You Know 8.05

The scatter plot shows measurements of hand and foot lengths for 9 students.

Plot the point to represent one more student's measurements.

Responses vary.

Hand Length (cm)	Foot Length (cm)
16	21



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Show What You Know **Lesson 6**

Name: _____ Date: _____ Period: _____

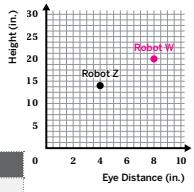
Show What You Know 8.06

The table shows the height and eye distance for Robot W.

a. Plot a point to represent Robot W.
Response shown on graph.

b. Complete the table with Robot Z's eye distance and height.
Response shown in table.

Robot	Eye Distance (in.)	Height (in.)
W	8	20
Z	4	14



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Show What You Know **Lesson 7**

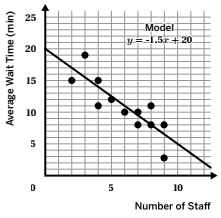
Name: _____ Date: _____ Period: _____

Show What You Know 8.07

This scatter plot shows the average wait times for customers and the number of staff members at 12 fast food restaurants.

What does the linear model predict the wait time will be for a fast food restaurant with 10 staff members?

5 minutes



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Show What You Know **Lesson 8**

Name: _____ Date: _____ Period: _____

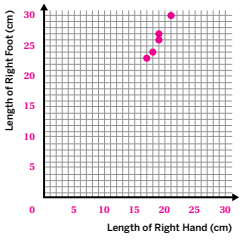
Show What You Know 8.08

The table shows the lengths, in centimeters, of the right hand and right foot of five different people.

a. Create a scale for the graph so that it fits all of the data.
Responses vary. Sample shown on graph.

b. Create a scatter plot of the data.
Responses vary. Sample shown on graph.

	Length of Right Hand (cm)	Length of Right Foot (cm)
Andre	19	27
Clare	21	30
Diego	17	23
Han	18	24
Mai	19	26



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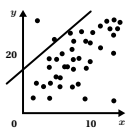
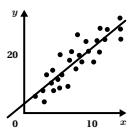
Show What You Know **Lesson 9**

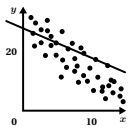
Name: _____ Date: _____ Period: _____

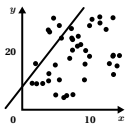
Show What You Know 8.09

Which scatter plot has the best line of fit?

A. 

B. 

C. 

D. 

Explain your thinking.

Explanations vary.

- The line passes through the "middle" of the data and follows the trend.
- The line has a slope that matches the trend of the data.
- The points are as close as possible to the line.

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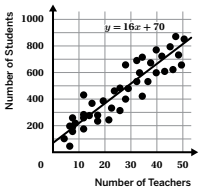
Show What You Know **Lesson 10**

Name: _____ Date: _____ Period: _____

Show What You Know 8.10

This scatter plot shows the number of teachers and students in 40 schools, along with a linear model for the data.



a. What type of association is there between the number of teachers and students?

A. Positive weak association
B. Positive strong association
C. Negative weak association
D. Negative strong association
E. No association

b. Identify the slope of the model and describe what it means in this situation.

The slope of the model is . . . 16

This means . . . *Responses vary.* This means the model predicts that the number of students will increase by 16 as the number of teachers increase by 1.

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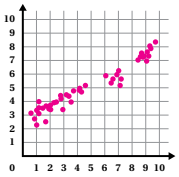
Show What You Know **Lesson 11**

Name: _____ Date: _____ Period: _____

Show What You Know 8.11

Create a scatter plot that has a strong positive linear association, with clusters.

Responses vary. Sample shown on graph.



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Show What You Know **Lesson 12**

Name: _____ Date: _____ Period: _____

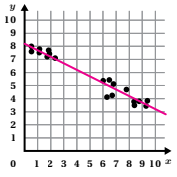
Show What You Know 8.12

a. Sketch a line on the scatter plot to fit the data.

Responses vary. Sample shown on graph.

b. Use your line of fit to predict the y-value of a new data point whose x-value is 4.

Responses between 5.5 and 6.5 are considered correct.



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Unit 9
Assessments and Rubrics

Name: ..... Date: ..... Period: .....

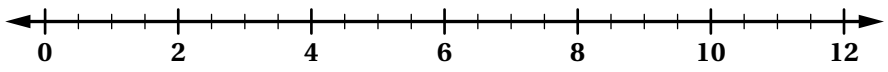
Pre-Unit Check

Unit 9

1. Select *all* the expressions that are equivalent to $3^4 \cdot 3^2$.

- ☐ **A.** 9^8
- ☐ **B.** 9^3
- ☐ **C.** 3^6
- ☐ **D.** 9^6
- ☐ **E.** 3^8

2. Plot and label these values on the number line: 3^2, 2^3, $\left(\frac{1}{2}\right)^2$, 5^1.



3. $\left(\frac{1}{4}\right)^3$ and $\frac{1}{4} \cdot \frac{1}{16}$ are equivalent expressions. Complete the table so that there are *five* equivalent expressions.

Expression 1	$\left(\frac{1}{4}\right)^3$
Expression 2	$\frac{1}{4} \cdot \frac{1}{16}$
Expression 3	
Expression 4	
Expression 5	

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Pre-Unit Check (continued)

Unit 9

4. Select *all* the expressions that are equal to $761 \div 5$.

- ☐ **A.** $76.1 \div 0.05$
- ☐ **B.** $762 \div 6$
- ☐ **C.** $0.761 \div 0.005$
- ☐ **D.** $7.61 \div 0.5$
- ☐ **E.** $7610 \div 50$

5. Here are two expressions:

Expression A: $8700 \cdot 0.45$ Expression B: $870 \cdot 45$

Which expression has a greater value? Circle one.

Expression A Expression B They have the same value

Show or explain your thinking.

6. Lola says that $4.5 \cdot 200$ has the same value as $45 \cdot 20$ and as $450 \cdot 2$.

Explain why Lola's claim is correct.

7. Which number is closest to the value of $2967 \div 0.003$?

- (A.) 1,000
- (B.) 10,000
- (C.) 100,000
- (D.) 1,000,000

Name: ..... Date: ..... Period: .....

Sub-Unit Quiz

Unit 9

1. Three of these equations are false and one is true. Select the *true* equation.

(A.) $1^0 = 0$

(B.) $3^{-2} \cdot 4^6 = 12^4$

(C.) $(2^5)^5 = 2^{10}$

(D.) $\frac{1}{10^2} = 10^{-2}$

2. Select *all* of the expressions that are equal to 12^8.

☐ **A.** $12^{10} \cdot 12^{-2}$

☐ **B.** $3^2 \cdot 4^6$

☐ **C.** $(12^8)^0$

☐ **D.** $\frac{12^{10}}{12^2}$

☐ **E.** $2^8 \cdot 6^8$

3. $\frac{-18x^5}{9x^4x^3}$

4. Select *all* expressions equivalent to $1.4x(4x - 3.2)$.

☐ **A.** $5.6x^2 + 4.48x$

☐ **B.** $1.4x(4x) - 1.4x(3.2)$

☐ **C.** $5.6x^2 + 4.48$

☐ **D.** $1.4x^2 + 4.48$

☐ **E.** $1.12x^2$

☐ **F.** $5.6x(x - 0.8)$

5. Which expression is equivalent to $3^5 \cdot 4^5$?

(A.) 7^5

(B.) 7^{10}

(C.) 12^5

(D.) 12^{25}

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Sub-Unit Quiz (continued)

6. Write a number in each box so that each equation is true.

a $y^{\square} \cdot y^{\square} = y^0$

b $\left(y^{\square}\right)^{\square} = \frac{1}{y^{10}}$

c $\frac{y^{\square} \cdot y^{-2}}{y^{\square}} = y$

7. Here are three expressions that have the same value:

$2^3 \cdot 2^3$ $\quad$ 2^6 $\quad$ 4^3

a Explain how you can tell that these expressions are equivalent.

b Using one or more exponents, write another expression that has the same value as the ones above, and explain how you know this expression has the same value as the others.

c Precious wrote that $\frac{2^{-4}}{2^{-10}}$ has the same value as the other expressions. Is her claim correct?

Explain how you know.

Standard	MA.7.NSO.1.1	MA.8.AR.1.1	MA.8.NSO.1.3	MA.8.AR.1.3
Problem(s)	5	3, 6a, 6b, 6c	1, 2, 7a, 7b, 7c	4

Problem 1

Standards: MA.8.NSO.1.3, MTR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: $\frac{1}{10^2} = 10^{-2}$			**Incorrect** choice. Students who select $(2^5)^5 = 2^{10}$ may have known to keep the same base and thought that addition was needed to simplify a power of a power.

Problem 2

Standards: MA.8.NSO.1.3, MTR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
All correct choices and **no incorrect** choices. • A • D • E	**One or two correct** choices and **no incorrect** choices. **All correct** choices and **one incorrect** choice.	**One or two correct** choices and **one incorrect** choice.	**Only incorrect** choices. **Two or more incorrect** choices with **some correct** choices.

Problem 3

Standard: MA.8.AR.1.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $\frac{-2}{x^2}$ or equivalent	Response shows **conceptual understanding** with minor errors. Student misunderstands exponents in the denominator and writes.	Response shows **incomplete understanding** with significant errors. Student uses incorrect sign.	Response shows **limited understanding**.

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Problem 4

Standards: MA.8.AR.1.3, MTR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: A, B, and F.	**One or two correct** choices and **no incorrect** choices. **All correct choices** and **one incorrect** choice.	**One or two correct choices** and **one incorrect** choice.	**Only incorrect** choices. **Two or more incorrect choices** with **some correct** choices.

Problem 5

Standard: MA.7.NSO.1.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: 12^5			**Incorrect** choice. Students who select 12^{25} may have known to multiply the bases and thought that multiplication was needed to simplify the exponent.

Problem 6a

Standards: MA.8.AR.1.1, MTR.5.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: *Responses vary.* Any pair of exponents whose sum is zero.	Response shows **conceptual understanding** with minor errors.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding**.

Problem 6b

Standards: MA.8.AR.1.1, MTR.5.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: *Responses vary.* Any pair of exponents whose product is -10.	Response shows **conceptual understanding** with minor errors.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding**.

Problem 6c

Standards: MA.8.AR.1.1, MTR.5.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: ***Responses vary.*** **Any pair of exponents where the exponent in the numerator is y greater than the exponent in the denominator.**	Response shows **conceptual understanding** with minor errors.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding**.

Problem 7a

Standard: MA.8.NSO.1.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: ***Responses vary.*** **All of the expressions equal 64 when evaluated.**	Response shows **conceptual understanding** with minor errors. E.g., Response includes that each expression has the same number of twos.	Response shows **incomplete understanding** with significant errors. E.g., Response includes they are all the same when multiplied.	Response shows **limited understanding**.

Problem 7b

Standard: MA.8.NSO.1.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. ***Responses vary.*** **$(2^3)^2$. I know it is equal because one of the given expressions is $2^3 \cdot 2^3$, and multiplying something by itself is the same as raising it to the second power.**	**Correct** response with **minor flaws** in **explanation**. **Incorrect** response with logical and **complete explanation**. E.g., Response includes "$2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$ because there are six 2s."	**Correct** response with **incomplete explanation**. **Incorrect** response with explanation that shows **partial understanding**. E.g., Response includes "$4^2 + 4^1$ because there are three 4s ."	**Incorrect** response with **no explanation**.

Problem 7c			**Standards:** MA.8.NSO.1.3, MTR.4.1
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response and **complete** explanation. **Yes. *Responses vary.* $\frac{2^{-4}}{2^{-10}}$ = is equal to $2^{(-4+10)}$, which is equal to 2^6. 2^6 is one of the given expressions and simplifies to 64, which is equivalent to all of the given expressions.**	**Correct** response with **minor flaws** in **explanation**. **Incorrect** response with logical and **complete explanation**. E.g., Response states "No, because $2^{(-4-10)} = 2^{-14}$ which is $(\frac{1}{2^{14}})$ and then multiply all the 2s in the denominator to find the result."	**Correct** response with **incomplete explanation**. **Incorrect** response with explanation that shows **partial understanding**. E.g., Response states "Move 2^{-10} to the top and then simplify."	**Incorrect** response with **no explanation**.

Name: ..... Date: ..... Period: .....

End-of-Unit Assessment

Unit 9

1. Which expression has the same value as 4^{12}?

A. $4^2 \cdot 4^{10}$ **B.** $4^6 + 4^6$ **C.** $4^3 \cdot 4^4$ **D.** 12^4

2. Select *all* the expressions that have the same value as $4 \cdot 10^6$.

☐ **A.** 40^6 ☐ **B.** $4{,}000{,}000$ ☐ **C.** $40 \cdot 10^5$

☐ **D.** $\frac{1.2 \cdot 10^9}{3 \cdot 10^2}$ ☐ **E.** $400{,}000$

3. About $3.9 \cdot 10^7$ people live in California.

About $1.3 \cdot 10^6$ people live in Maine.

Which number completes this sentence?

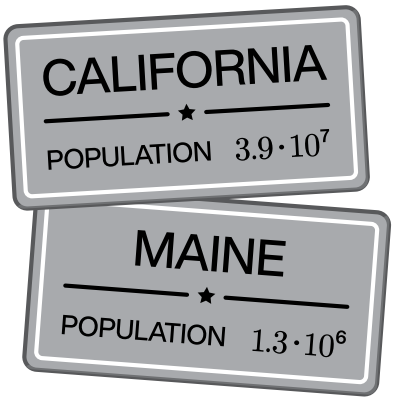
___ *times as many people live in California as live in Maine.*

A. 2.6

B. 3

C. 26

D. 30



4. A person blinks about 20 times each minute.

About how many times will a person blink in 80 years (about $4.2 \cdot 10^7$ minutes)?

Write your answer in scientific notation.

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End-of-Unit Assessment (continued)

Unit 9

5. **a** Write each number in scientific notation.

Number	Scientific Notation
$8{,}200{,}000$	
0.00041	

b Complete this sentence: $8{,}200{,}000$ is _____ times as large as 0.00041. Write your answer in scientific notation.

6. Write a number in each box so that:

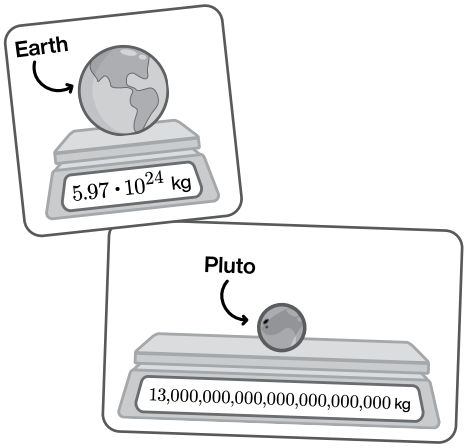
- Each equation is true.
- Each equation has at least one negative number.

a $x^{\square} \cdot x^{\square} = x^0$

b $\dfrac{x^3}{x^{\square}} = x^{\square}$

c $(x^3)^{\square} = x^6$

7. Here is the mass of Earth and Pluto.



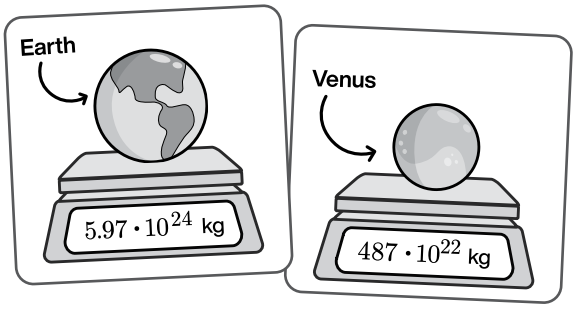
a Calculate the total mass of Earth and Pluto.

b Amoli says the mass of 100 Plutos is less than the mass of Earth.

Is her claim correct?
Yes

Show or explain your thinking.

c What is the difference between the mass of Earth and the mass of Venus?



Show or explain your thinking.

End-of-Unit Assessment (continued)

Unit 9

8. Rewrite each expression as a single power.

Expression	Single Power
$4^5 \cdot 4^8$	
$5^3 \cdot 5^3 \cdot 5^3$	
$(2^6)^7$	
$(10^4)^4$	

9. Rewrite each expression as a single power.

Expression	Single Power
$\frac{4^9}{4^3 \cdot 4^4}$	
$\frac{(5^4)^2}{5}$	
$\frac{9^8 \cdot 9^3}{9^4}$	
$\frac{3^4 \cdot 3^4 \cdot 3^4}{3 \cdot 3 \cdot 3}$	

10. Write a number in each box so that each equation is true.

A. $\frac{5^{\square} \cdot 5^{\square}}{5^{\square}} = 5^8$

B. $(-5)^{\square} \cdot (-5)^{\square} = 5^{\square}$

C. $\frac{5^{\square} \cdot 5^{\square}}{(5^2)^{\square}} = 5^4$

Standard	MA.7.NSO.1.1	MA.8.AR.1.1	MA.8.NSO.1.4	MA.8.NSO.1.5	MA.8.NSO.1.6	MA.8.NSO.1.3
Problem(s)	8, 9, 10	2, 6a, 6b, 6c	2, 3, 5a, 5b, 7b	4, 7a, 7c	4, 7a, 7b, 7c	1

Problem 1

Standard: MA.8.AR.1.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: $4^2 \cdot 4^{10}$			**Incorrect** choice. Students who select $4^6 + 4^6$ may remember that exponents are added but not understand when and why that rule works. Students who select $4^3 \cdot 4^4$ may be multiplying the exponents.

Problem 2

Standards: MA.8.AR.1.1, MA.8.NSO.1.4

4 Meeting	3 Approaching	2 Developing	1 Beginning
All correct choices and **no incorrect** choices. • $4{,}000{,}000$ • $40 \cdot 10^5$ • $\frac{1.2 \cdot 10^9}{3 \cdot 10^2}$	**One or two correct** choices and **no incorrect** choices. **All correct** choices and **one incorrect** choice.	**One or two correct** choices and **one incorrect** choice.	**Only incorrect** choices. **Two or more incorrect** choices with **some correct** choices.

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Problem 3

Standard: MA.8.NSO.1.4

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: **30**			**Incorrect** choice. Students who select 2.6 or 26 may have subtracted the coefficients without first considering the operation to use. Students who select 3 may have correctly divided the coefficients without first considering the exponents.

Problem 4

Standards: MA.8.NSO.1.5, MA.8.NSO.1.6, MTR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: **Responses between $8 \cdot 10^8$ and $8.4 \cdot 10^8$ are considered correct.**	Response shows **conceptual understanding** with minor errors. Students who write $8.4 \cdot 10^7$ or $8.4 \cdot 10^9$ may have correctly multiplied the coefficients but did not account for the exponent when writing in scientific notation.	Response shows **incomplete understanding** with significant errors. Students who write $2.1 \cdot 10^6$ may have divided instead of multiplied.	Response shows **limited understanding**.

Problem 5a

Standards: MA.8.NSO.1.4, MTR.5.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: • **$8.2 \cdot 10^6$** • **$4.1 \cdot 10^{-4}$**	Response shows **conceptual understanding** with minor errors. E.g., One expression is correct and the other expression is off by one power.	Response shows **incomplete understanding** with significant errors. E.g., Students write $82 \cdot 10^5$ and $41 \cdot 10^{-3}$.	Response shows **limited understanding**. E.g., Both expressions are off by one power.

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Problem 5b			Standards: MA.8.NSO.1.4, MTR.5.1
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response: $2 \cdot 10^{10}$	Response shows **conceptual understanding** with minor errors. E.g., Expression is off by one power.	Response shows **incomplete understanding** with significant errors. E.g., Student uses a negative exponent.	Response shows **limited understanding**.

Problem 6a			Standards: MA.8.AR.1.1, MTR.5.1
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response: *Responses vary.* Any pair of a positive and a negative exponent whose sum is zero.	Response shows **conceptual understanding** with minor errors.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding**.

Problem 6b			Standards: MA.8.AR.1.1, MTR.5.1
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response: *Responses vary.* Any pair of a positive and a negative exponent whose sum is 3.	Response shows **conceptual understanding** with minor errors.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding**.

Problem 6c			Standards: MA.8.AR.1.1, MTR.5.1
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response: 2	Response shows **conceptual understanding** with minor errors.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding**.

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Problem 7a

Standards: MA.8.NSO.1.5, MA.8.NSO.1.6, MTR.6.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: **$5.983 \cdot 10^{24}$ kilograms (or equivalent)**	Response shows **conceptual understanding** with minor errors. E.g., Response incorrectly converts the mass of Pluto to scientific notation before adding.	Response shows **incomplete understanding** with significant errors. Students who write $7.27 \cdot 10^{46}$ may have correctly written the mass of Pluto using scientific notation, then added both the coefficients and the exponents.	Response shows **limited understanding**.

Problem 7b

Standards: MA.8.NSO.1.4, MA.8.NSO.1.6, MTR.6.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. **Yes. *Explanations vary.* 100 Plutos would have a mass of $1.3 \cdot 10^{24}$ kg, which is less than the mass of Earth.**	**Correct** response with **minor flaws in explanation**. **Incorrect** response with logical and **complete explanation**. Students who correctly explain that the mass of 100 Plutos is about $1.3 \cdot 10^{24}$ kg may have misunderstood the question.	**Correct** response with **incomplete explanation**. Students who do not compare the mass of Earth and 100 Plutos may have reasoned about a solution without verifying numerically. **Incorrect** response with explanation that shows **partial understanding**.	**Incorrect** response with **no explanation**.

Problem 7c

Standards: MA.8.NSO.1.5, MA.8.NSO.1.6, MTR.6.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. **$1.1 \cdot 10^{24}$ kg (or equivalent). *Explanations vary.* In order to subtract, I rewrote Venus's mass as $4.87 \cdot 10^{24}$, then I subtracted the coefficients.**	**Correct** response with **minor flaws in explanation**. **Incorrect** response with logical and **complete explanation**. E.g., Response includes an error subtracting 5.9 and 4.87 but correctly writes the result as the coefficient times 10^{24}.	**Correct** response with **incomplete explanation**. **Incorrect** response with explanation that shows **partial understanding**. Students who write $481.03 \cdot 10^{2}$ may have subtracted the coefficients and the exponents separately.	**Incorrect** response with **no explanation**.

**In Form B, 8.EE.A.4 is addressed in 7b and 8.EE.A.3 is addressed in 7c.*

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Problem 8			Standards: MA.7.NSO.1.1, MTR.5.1
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
All correct answers and **no incorrect** answers. 4^{13} 5^{9} 2^{42} 10^{16}	**Three correct** answers.	**Two correct** answers.	**One or no correct** answers.

Problem 9			Standards: MA.7.NSO.1.1, MTR.5.1
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
All correct answers and **no incorrect** answers. 4^{2} 5^{7} 9^{7} 3^{9}	**Three correct** answers.	**Two correct** answers.	**One or no correct** answers.

Problem 10a			Standards: MA.7.NSO.1.1, MTR.5.1
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Number choices make a **true** equation. *Answers vary.* Possible exponents are shown. $\frac{5^{6} \cdot 5^{4}}{5^{2}} = 5^{8}$			Number choices make an **untrue** equation.

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Problem 10b			Standards: MA.7.NSO.1.1, MTR.5.1
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Number choices make a **true** equation. *Answers vary.* Possible exponents are shown. $(-5)^2 \cdot (-5)^2 = 5^4$			Number choices make an **untrue** equation.

Problem 10c			Standards: MA.7.NSO.1.1, MTR.5.1
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Number choices make a **true** equation. *Answers vary.* Possible exponents are shown. $\frac{5^3 \cdot 5^5}{(5^2)^2} = 5^4$			Number choices make an **untrue** equation.

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Name: ..... Date: ..... Period: .....

End-of-Unit Assessment

Unit 9

1. Which expression has the same value as 6^{10}?

(A.) $6^5 + 6^5$ (B.) 10^6 (C.) $6^2 \cdot 6^5$ (D.) $6^2 \cdot 6^8$

2. Select *all* the expressions that have the same value as $6 \cdot 10^5$.

☐ **A.** $60 \cdot 10^6$ ☐ **B.** $600{,}000$ ☐ **C.** $\frac{12 \cdot 10^8}{2 \cdot 10^3}$

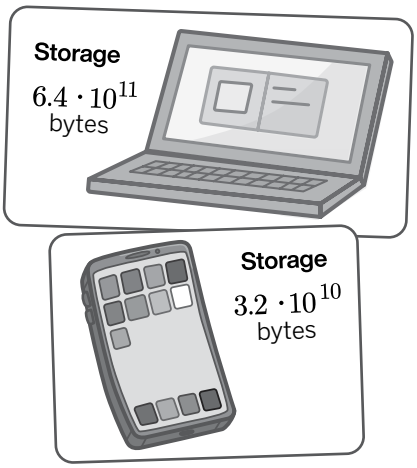
☐ **D.** 60^5 ☐ **E.** $60{,}000$

3. Sol's laptop has $6.4 \cdot 10^{11}$ bytes of storage.

Sol's phone has $3.2 \cdot 10^{10}$ bytes of storage.

Which number completes this sentence?

The laptop has ___ times as much storage as the phone.



(A.) 2

(B.) 3.2

(C.) 20

(D.) 32

4. A cat sleeps about 20 hours per day.

About how many hours would this cat sleep in 17 years (about $6.2 \cdot 10^3$ days)?

Write your answer in scientific notation.

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5. **a** Write each number in scientific notation.

Number	Scientific Notation
$6{,}600{,}000$	
0.0022	

b Complete this sentence: $6{,}600{,}000$ is _____ times as large as 0.0022.
Write your answer in scientific notation.

6. Write a number in each box so that:

- Each equation is true.
- Each equation has at least one negative number.

a $y^{\square} \cdot y^{\square} = 3^0$

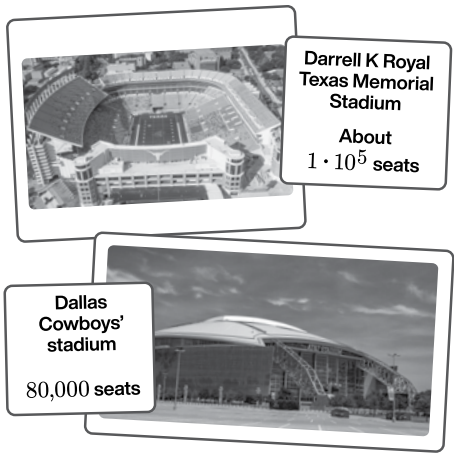
b $y^{-2} \cdot y^{\square} = y^4$

c $\dfrac{y^{\square}}{y^2} = y^{\square}$

End-of-Unit Assessment (continued)

Unit 9

7. Here are the number of seats in the two largest stadiums in Texas.



Source: *Shutterstock*

a Calculate the total seating of the two stadiums.

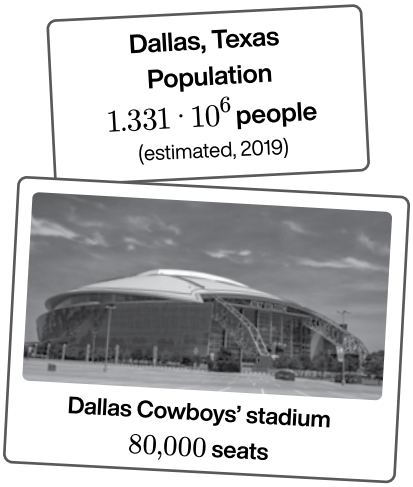
b Calculate the difference between the seating at these two stadiums.

Show or explain your thinking.

c Gabriel says that 10 Dallas Cowboys' stadiums could seat the entire population of Dallas.

Is his claim correct?

Show or explain your thinking.



8. Rewrite each expression as a single power.

Expression	Single Power
$5^6 \cdot 5^3$	
$7^2 \cdot 7^2 \cdot 7^2$	
$(3^5)^2$	
$(6^4)^4$	

9. Rewrite each expression as a single power.

Expression	Single Power
$\frac{5^8}{5^3 \cdot 5^2}$	
$\frac{(3^4)^9}{3}$	
$\frac{8^6 \cdot 8^2}{8^5}$	
$\frac{7^5 \cdot 7^5 \cdot 7^5}{7 \cdot 7 \cdot 7}$	

10. Write a number in each box so that each statement is true.

A. $\frac{7^{\square} \cdot 7^{\square}}{7^{\square}} = 7^{\square}$

B. $(-6)^{\square} \cdot (-6)^{\square} = (-6)^{\square}$

C. $\frac{9^{\square} \cdot 9^{\square}}{(9^2)^{\square}} = 9^{\square}$

Standard	MA.7.NSO.1.1	MA.8.AR.1.1	MA.8.NSO.1.4	MA.8.NSO.1.5	MA.8.NSO.1.6
Problem(s)	8, 9, 10	1, 2, 6a, 6b, 6c	2, 3, 5a, 5b, 7b	4, 7a, 7c	4, 7a, 7b, 7c

Problem 1

Standard: MA.8.AR.1.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: $6^2 \cdot 6^8$			**Incorrect** choice. Students who select $6^5 + 6^5$ may remember that exponents are added but not understand when and why that rule works. Students who select $6^2 \cdot 6^5$ may be multiplying the exponents.

Problem 2

Standards: MA.8.AR.1.1, MA.8.NSO.1.4

4 Meeting	3 Approaching	2 Developing	1 Beginning
Both correct choices and **no incorrect** choices. • $600{,}000$ • $\frac{12 \cdot 10^8}{2 \cdot 10^3}$	**One correct** choice and **no incorrect** choices. **Both correct** choices and **one incorrect** choice.	**One correct** choice and **one incorrect** choice.	**Only incorrect** choices. **Two or more incorrect** choices with **some correct** choices.

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Problem 3

Standard: MA.8.NSO.1.4

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: 20			**Incorrect** choice. Students who select 3.2 or 32 may have subtracted the coefficients without first considering the operation to use. Students who select 2 may have correctly divided the coefficients without first considering the exponents.

Problem 4

Standards: MA.8.NSO.1.5, MA.8.NSO.1.6, MTR.2.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: Responses between $1.2 \cdot 10^5$ and $1.24 \cdot 10^5$ hours are considered correct.	Response shows **conceptual understanding** with minor errors. Students who write $1.24 \cdot 10^4$ or $1.24 \cdot 10^6$ may have correctly multiplied the coefficients but did not account for the exponent when writing in scientific notation.	Response shows **incomplete understanding** with significant errors. Students who write $3.1 \cdot 10^2$ may have divided instead of multiplied. Students who write $124 \cdot 10^3$ may need support writing numbers in scientific notation.	Response shows **limited understanding**.

Problem 5a

Standards: MA.8.NSO.1.4, MTR.5.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: • $6.6 \cdot 10^6$ • $2.2 \cdot 10^{-3}$	Response shows **conceptual understanding** with minor errors. E.g., One expression is correct and the other expression is off by one power.	Response shows **incomplete understanding** with significant errors. E.g., Students write $66 \cdot 10^5$ and $22 \cdot 10^{-2}$.	Response shows **limited understanding**.

Problem 5b	Standards: MA.8.NSO.1.4, MTR.5.1		
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response: $3 \cdot 10^9$	Response shows **conceptual understanding** with minor errors. E.g., Expression is off by one power.	Response shows **incomplete understanding** with significant errors. E.g., Student uses a negative exponent.	Response shows **limited understanding**.

Problem 6a	Standards: MA.8.AR.1.1, MTR.5.1		
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response: *Responses vary.* Any pair of a positive and a negative exponent whose sum is zero.	Response shows **conceptual understanding** with minor errors.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding**.

Problem 6b	Standards: MA.8.AR.1.1, MTR.5.1		
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response: 6	Response shows **conceptual understanding** with minor errors.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding**.

Problem 6c	Standards: MA.8.AR.1.1, MTR.5.1		
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Correct response: *Responses vary.* Any pair of a positive and a negative exponent whose difference is 2.	Response shows **conceptual understanding** with minor errors.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding**.

Problem 7a

Standards: MA.8.NSO.1.5, MA.8.NSO.1.6, MTR.6.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: **$1.8 \cdot 10^5$ seats (or equivalent)**	Response shows **conceptual understanding** with minor errors. E.g., Response incorrectly converts the seating in the Cowboys' stadium to scientific notation before adding.	Response shows **incomplete understanding** with significant errors. E.g., Students who write $9 \cdot 10^9$ may have correctly written the seating in the Cowboys' stadium using scientific notation, then added both the coefficients and the exponents.	Response shows **limited understanding**.

Problem 7b

Standards: MA.8.NSO.1.4, MA.8.NSO.1.6, MTR.6.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. **$2 \cdot 10^4$ seats (or equivalent).** ***Explanations vary.*** **I rewrote the seating in the Darryl K Royal Texas Memorial Stadium as $10 \cdot 10^4$ and the Dallas Cowboys' stadium as $8 \cdot 10^4$, then I subtracted $10 - 8$.**	**Correct** response with **minor flaws in explanation**. **Incorrect** response with logical and **complete explanation**. E.g., Response includes an error subtracting but a correct result of the student's coefficient times 10^4.	**Correct** response with **incomplete explanation**. **Incorrect** response with explanation that shows **partial understanding**. Students who write $7 \cdot 10^1$ may have subtracted the coefficients and the exponents separately.	**Incorrect** response with **no explanation**.

Problem 7c

Standards: MA.8.NSO.1.5, MA.8.NSO.1.6, MTR.6.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. **No.** ***Explanations vary.*** **10 of the Cowboys' stadiums would seat $8 \cdot 10^5$ people, which is less than the population of Dallas.**	**Correct** response with **minor flaws in explanation**. **Incorrect** response with logical and **complete explanation**. Students who correctly explain that 10 of the Cowboys stadiums seat about $8 \cdot 10^5$ people may have misunderstood the question.	**Correct** response with **incomplete explanation**. Students who do not compare the seating in the stadium and the population of Dallas may have reasoned about a solution without verifying numerically. **Incorrect** response with explanation that shows **partial understanding**.	**Incorrect** response with **no explanation**.

**In Form A, 8.EE.A.3 is addressed in 7b and 8.EE.A.4 is addressed in 7c.*

Problem 8

Standard: MA.7.NSO.1.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
All correct answers and **no incorrect** answers. 5^9 7^6 3^{10} 6^{16}	**Three correct** answers.	**Two correct** answers.	**Incorrect** choice. Students who select one of the other choices may have difficulty following the order of operations.

Problem 9

Standard: MA.7.NSO.1.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
All correct answers and **no incorrect** answers. 5^3 3^{35} 8^3 7^{12}	**Three correct** answers.	**Two correct** answers.	**One or no correct** answers.

Problem 10a

Standard: MA.7.NSO.1.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Number choices make a **true** equation. ***Exponents vary.*** **Possible exponents are shown.** $\frac{7^4 \cdot 7^4}{7^2} = 7^6$			Number choices make an **untrue** equation.

Problem 10b			Standard: MA.7.NSO.1.1
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Number choices make a **true** equation. ***Exponents vary. Possible exponents are shown.*** $(-6)^2 \cdot (-6)^3 = 6^5$			Number choices make an **untrue** equation.

Problem 10c			Standard: MA.7.NSO.1.1
4 Meeting	**3 Approaching**	**2 Developing**	**1 Beginning**
Number choices make a **true** equation. ***Exponents vary. Possible exponents are shown.*** $\frac{9^6 \cdot 9^5}{(9^2)^2} = 9^7$			Number choices make an **untrue** equation.

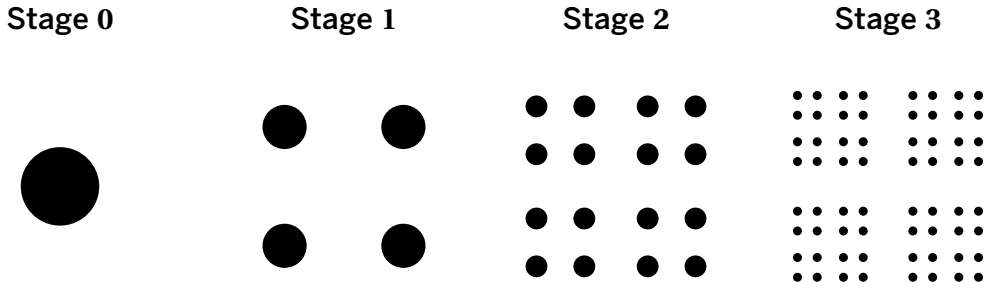
Unit 9
Show What You Know PDFs

Name: Date: Period:

Show What You Know

9.01

Here is a new pattern.



How many circles will there be in Stage 5? Write your answer as a number or expression.

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Name: Date: Period:

Show What You Know

9.02

Select *all* the expressions that are equivalent to 12^6.

- ☐ **A.** $(12^2)^4$
- ☐ **B.** $3^6 \cdot 4^6$
- ☐ **C.** $12^2 \cdot 12^3$
- ☐ **D.** $(12^3)^2$
- ☐ **E.** $12^3 + 12^3$

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Show What You Know

9.03

Here are two expressions. Are these expressions equivalent?

$3^2 \cdot 3 \cdot 3$

9^2

Show or explain your thinking.

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Name: Date: Period:

Show What You Know

9.04

Select *all* the expressions that are equivalent to 8^8.

- ☐ **A.** $2^3 \cdot 4^5$
- ☐ **B.** $2^8 \cdot 4^8$
- ☐ **C.** $\frac{8^{10}}{8^2}$
- ☐ **D.** $8^3 + 8^5$
- ☐ **E.** $\frac{8^2 \cdot 8^3 \cdot 8^4}{8^1}$

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Show What You Know

9.05

Select *all* the expressions that are equivalent to 10^6.

- ☐ **A.** $10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10$
- ☐ **B.** $10^3 + 10^3$
- ☐ **C.** 60
- ☐ **D.** $10^3 \cdot 10^2$
- ☐ **E.** $\frac{10^9}{10^3}$

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Name: Date: Period:

Show What You Know

9.06

Show or explain why $-4^2 \cdot (-4)^2$ is *not* equal to $(-4)^4$.

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Name: Date: Period:

Show What You Know

9.07

Select *all* the expressions that are equivalent to 3^{-2}.

- ☐ **A.** $\frac{1}{3^2}$
- ☐ **B.** 9
- ☐ **C.** -3^2
- ☐ **D.** $\frac{1}{9}$
- ☐ **E.** -6

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Name: Date: Period:

Show What You Know

9.08

Yona was trying to write $2^3 \cdot 2^2$ as a single power of 2. She wrote: $2^3 \cdot 2^2 = 2^{3 \cdot 2} = 2^6$.

Is Yona's work correct?

Explain your thinking.

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Name: Date: Period:

Show What You Know

9.09

Simplify the expression $\frac{24x^5y}{6x^2y^3}$.

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Name: Date: Period:

Show What You Know

9.10

Select *all* expressions equivalent to $-\frac{1}{4}x^2(8x + 24)$.

- ☐ **A.** $-2x^3 + 6x^2$
- ☐ **B.** $-2x^3 - 6x^2$
- ☐ **C.** $-2x^2 - 6x^2$
- ☐ **D.** $-2x^2(x + 3)$

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Name: Date: Period:

Show What You Know

9.11

Determine the GCF of each pair of expressions below.

a $9y^3$ and $15y$

b $\frac{1}{5}a^3b^2$ and $\frac{3}{5}a^2b$

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Name: Date: Period:

Show What You Know

9.12

Write $3{,}500{,}000$ as a combination of powers of 10.

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Show What You Know

9.13

Write 0.00052 as a number times a single power of 10.

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Show What You Know

9.14

Write each number in scientific notation.

Number	Scientific Notation
48,200	
0.00099	
$36 \cdot 10^5$	

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Name: Date: Period:

Show What You Know

9.15

Multiply or divide each expression. Write your answer in scientific notation.

a $(3 \cdot 10^{-5}) \cdot (9 \cdot 10^{11})$

b $\frac{6 \cdot 10^{8}}{2 \cdot 10^{3}}$

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Name: Date: Period:

Show What You Know

9.16

The largest U.S. state is Alaska. The smallest U.S. state is Rhode Island.

Alaska is about how many times as large as Rhode Island? Explain your thinking.

Alaska is about:
$1.7 \cdot 10^6$
square kilometers

Rhode Island is about:
$4 \cdot 10^3$
square kilometers

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Name: Date: Period:

Show What You Know

9.17

There are about:

- $8 \cdot 10^9$ grains of sand in one cubic meter.
- $7 \cdot 10^{11}$ cubic meters of sand on Earth.
- 10^{11} stars in a galaxy.
- 10^{12} galaxies in the universe.

Based on these assumptions, which is greater?

A. The number of stars in the universe.

B. The number of grains of sand on Earth.

C. Both are about equal.

Explain your thinking.

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Name: Date: Period:

Show What You Know

9.18

Determine the value of $2.3 \cdot 10^5 + 3.6 \cdot 10^6$. Write your answer in scientific notation.

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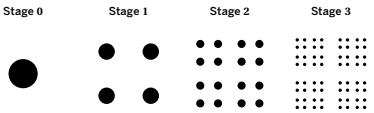
Show What You Know **Lesson 1**

Name: _____ Date: _____ Period: _____

Show What You Know 9.01

Here is a new pattern.



How many circles will there be in Stage 5? Write your answer as a number or expression.

4^5 (or equivalent)

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Show What You Know **Lesson 2**

Name: _____ Date: _____ Period: _____

Show What You Know 9.02

Select *all* the expressions that are equivalent to 12^6.

- ☐ A. $(12^3)^4$
- ☑ B. $3^6 \cdot 4^6$
- ☐ C. $12^2 \cdot 12^3$
- ☑ D. $(12^3)^2$
- ☐ E. $12^3 + 12^3$

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Show What You Know **Lesson 3**

Name: _____ Date: _____ Period: _____

Show What You Know 9.03

Here are two expressions. Are these expressions equivalent?

$3^2 \cdot 3 \cdot 3$ 9^2

Yes

Show or explain your thinking.

Explanations vary. $3^2 \cdot 3 \cdot 3$ can be rewritten as $3^2 \cdot 3^2$. Since the exponents are the same, I can multiply 3 by 3 to get $(3 \cdot 3)^2$ or 9^2.

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Show What You Know **Lesson 4**

Name: _____ Date: _____ Period: _____

Show What You Know 9.04

Select *all* the expressions that are equivalent to 8^8.

- ☐ A. $2^3 \cdot 4^5$
- ☑ B. $2^8 \cdot 4^8$
- ☑ C. $\frac{8^{10}}{8^2}$
- ☐ D. $8^3 + 8^5$
- ☑ E. $\frac{8^2 \cdot 8^3 \cdot 8^4}{8^1}$

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Show What You Know **Lesson 5**

Name: _____ Date: _____ Period: _____

Show What You Know 9.05

Select *all* the expressions that are equivalent to 10^6.

- ☑ A. $10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10$
- ☐ B. $10^3 + 10^3$
- ☐ C. 60
- ☐ D. $10^3 \cdot 10^2$
- ☑ E. $\frac{10^9}{10^3}$

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Show What You Know **Lesson 6**

Name: _____ Date: _____ Period: _____

Show What You Know 9.06

Show or explain why $-4^2 \cdot (-4)^2$ is *not* equal to $(-4)^4$.

-4^2 is equal to -16, since the negative sign is applied after raising 4 to the power of 2.
$(-4)^2$ is equal to 16, since the negative sign is inside the parentheses.
When multiplying these two values together the result is -256.
Since $(-4)^4$ has an even numbered exponent, the result will be positive, not negative.

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Show What You Know **Lesson 7**

Name: _____ Date: _____ Period: _____

Show What You Know 9.07

Select *all* the expressions that are equivalent to 3^{-2}.

- ☑ A. $\frac{1}{3^2}$
- ☐ B. 9
- ☐ C. -3^2
- ☑ D. $\frac{1}{9}$
- ☐ E. -6

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Show What You Know **Lesson 8**

Name: _____ Date: _____ Period: _____

Show What You Know 9.08

Yona was trying to write $2^3 \cdot 2^2$ as a single power of 2. She wrote: $2^3 \cdot 2^2 = 2^{3 \cdot 2} = 2^6$.

Is Yona's work correct?

No

Explain your thinking.

Explanations vary. When multiplying terms with the same base, you can rewrite the expression by *adding* the exponents, not multiplying them.

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Show What You Know **Lesson 9**

Name: _____ Date: _____ Period: _____

Show What You Know 9.09

Simplify the expression $\frac{24x^5y}{6x^2y^3}$.

$\frac{4x^3}{y^2}$

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Show What You Know **Lesson 10**

Name: _____ Date: _____ Period: _____

Show What You Know 9.10

Select *all* expressions equivalent to $-\frac{1}{4}x^2(8x + 24)$.

- ☐ A. $-2x^3 + 6x^2$
- ☑ B. $-2x^3 - 6x^2$
- ☐ C. $-2x^2 - 6x^2$
- ☑ D. $-2x^2(x + 3)$

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Show What You Know **Lesson 11**

Name: _____ Date: _____ Period: _____

Show What You Know 9.11

Determine the GCF of each pair of expressions below.

a. $9y^3$ and $15y$ $3y$

b. $\frac{1}{5}a^2b^2$ and $\frac{3}{5}a^2b$ $\frac{1}{5}a^2b$

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Show What You Know **Lesson 12**

Name: _____ Date: _____ Period: _____

Show What You Know 9.12

Write $3{,}500{,}000$ as a combination of powers of 10.

Responses vary.

- $3 \cdot 10^6 + 5 \cdot 10^5$
- $3.5 \cdot 10^6$
- $35 \cdot 10^5$
- $2 \cdot 10^6 + 15 \cdot 10^5$

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Show What You Know **Lesson 13**

Name: _____ Date: _____ Period: _____

Show What You Know 9.13

Write 0.00052 as a number times a single power of 10.

Responses vary.

- $52 \cdot 10^{-5}$
- $5.2 \cdot 10^{-4}$
- $0.52 \cdot 10^{-3}$

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Show What You Know **Lesson 14**

Name: _____ Date: _____ Period: _____

Show What You Know 9.14

Write each number in scientific notation.

Number	Scientific Notation
$48{,}200$	$4.82 \cdot 10^{4}$
0.00099	$9.9 \cdot 10^{-4}$
$36 \cdot 10^{5}$	$3.6 \cdot 10^{6}$

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Show What You Know **Lesson 15**

Name: _____ Date: _____ Period: _____

Show What You Know 9.15

Multiply or divide each expression. Write your answer in scientific notation.

a. $(3 \cdot 10^{-5}) \cdot (9 \cdot 10^{11})$

$2.7 \cdot 10^{7}$

b. $\frac{6 \cdot 10^{8}}{2 \cdot 10^{3}}$

$3 \cdot 10^{5}$

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Show What You Know **Lesson 16**

Name: _____ Date: _____ Period: _____

Show What You Know 9.16

The largest U.S. state is Alaska. The smallest U.S. state is Rhode Island.

Alaska is about how many times as large as Rhode Island? Explain your thinking.

Responses vary.

- 500 times as large. An area $1{,}000$ times as large as Rhode Island would be $4 \cdot 10^{6}$ square kilometers. Alaska is about $2 \cdot 10^{6}$ square kilometers, or half of $4 \cdot 10^{6}$, so Alaska is about 500 times as large as Rhode Island.
- $4 \cdot 10^{2}$ times as large. $1.7 \cdot 10^{6}$ is about the same as $16 \cdot 10^{5}$. To make $4 \cdot 10^{5}$ into $16 \cdot 10^{5}$, I can multiply by 4 and 10^{2}.

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Show What You Know **Lesson 17**

Name: _____ Date: _____ Period: _____

Show What You Know 9.17

There are about:

- $8 \cdot 10^9$ grains of sand in one cubic meter.
- $7 \cdot 10^{11}$ cubic meters of sand on Earth.
- 10^{11} stars in a galaxy.
- 10^{12} galaxies in the universe.

Based on these assumptions, which is greater?

A. The number of stars in the universe.

B. The number of grains of sand on Earth.

C. Both are about equal.

Explain your thinking.

Explanations vary. There are $10^{11} \cdot 10^{12}$ stars in the universe, which is 10^{23}. There are only $5.6 \cdot 10^{21}$ grains of sand on Earth because $(8 \cdot 10^9) \cdot (7 \cdot 10^{11})$ is $5.6 \cdot 10^{21}$. Therefore, the number of stars in the universe is greater than the number of grains of sand on Earth.

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Show What You Know **Lesson 18**

Name: _____ Date: _____ Period: _____

Show What You Know 9.18

Determine the value of $2.3 \cdot 10^5 + 3.6 \cdot 10^6$. Write your answer in scientific notation.

$3.83 \cdot 10^6$. *Work varies.*

$$2.3 \cdot 10^5 + 3.6 \cdot 10^6 = 2.3 \cdot 10^5 + 36 \cdot 10^5$$
$$= 38.3 \cdot 10^5$$
$$= 3.83 \cdot 10^6$$

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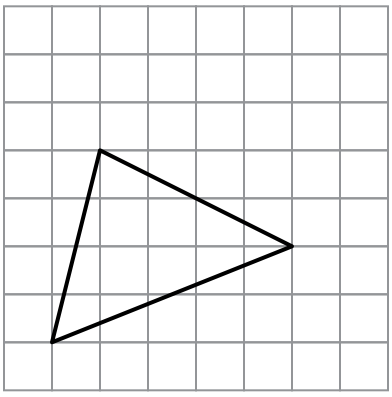
Unit 10
Assessments and Rubrics

Name: ..... Date: ..... Period: .....

Pre-Unit Check

Unit 10

1. What is the area of this triangle (in square units)?



Explain your thinking.

2. Write a solution for each equation.

a $a^2 = 25$

b $b^3 = 8$

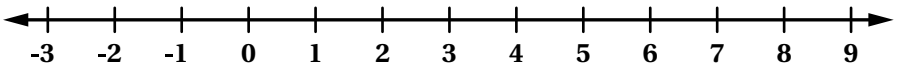
c $10^c = 1000$

3. Evaluate each expression for the given value.

a a^2 when $a = \frac{3}{4}$

b b^3 when $b = 1.1$

4. Plot these values on the number line: $\frac{3}{4}$, -1.5, 3^2, 0.5^3.



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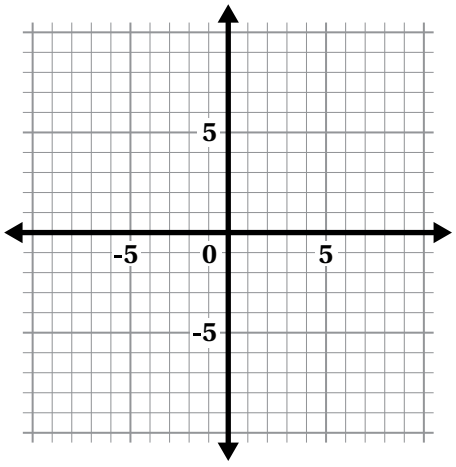
Pre-Unit Check (continued)

Unit 10

5. How long is the segment from (-5, 2) to (-5, -8)?

Use the graph if it helps you with your thinking.



Name: ..... Date: ..... Period: .....

Sub-Unit Quiz

Unit 10

1. Which value is an exact solution to the equation $z^2 = 20$?

(A.) $z = 10$

(B.) $z = \sqrt{20}$

(C.) $z = 4.5$

(D.) $z = \sqrt{10}$

2. Which value is the exact edge length of a cube whose volume is 36 cubic inches?

(A.) $\sqrt[3]{36}$ inches

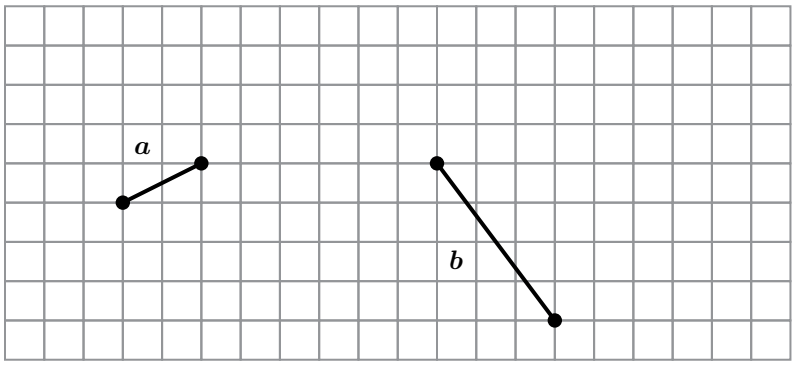
(B.) 6 inches

(C.) $\sqrt{36}$ inches

(D.) 12 inches

3. Determine the exact length of each line segment, in units. Show or explain your thinking.

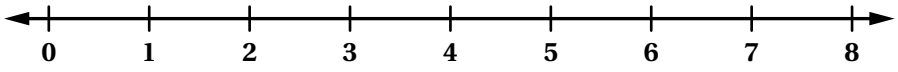
Line segment	Exact Length (units)
a	
b	



Sub-Unit Quiz (continued)

Unit 10

4. Plot these values on the number line: $\sqrt[3]{64}, \sqrt{37}, \sqrt{9}, \sqrt[3]{7}$.



5. Here is Leo's work to determine the value of $\sqrt[3]{12}$.

Leo

$\sqrt[3]{12}$

$12 \div 3 = 4$

$\sqrt[3]{12} = 4$

a Describe the mistake that he made.

b What whole number is $\sqrt[3]{12}$ closest to?

Standard	MA.8.NSO.1.1	MA.8.NSO.1.2	MA.8.AR.2.3
Problem(s)	3, 4	4, 5	1, 2, 3

Problem 1

Standard: MA.8.AR.2.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: $z = \sqrt{20}$			**Incorrect** choice. Students who select $z = 10$ may have solved $2z = 20$ instead.

Problem 2

Standards: MA.8.AR.2.3, MTR.3.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: $\sqrt[3]{36}$ **inches**			**Incorrect** choice. Students who select 12 *inches* may have solved $3s = 36$ instead.

Problem 3

Standards: MA.8.AR.2.3, MTR.5.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $a = \sqrt{5}$ **units,** $b = 5$ **units** ***Explanations vary.*** **I drew a tilted square using the segment as one side. The area of a tilted square can be divided into four congruent triangles and a square. I calculated the area of one triangle, multiplied that by 4, and then added the area of the square. The segment length is the square root of the area of the tilted square.**	Response shows **conceptual understanding** with minor errors. One or two segments calculated with **minor flaws in explanation**. E.g., "The length of the segment looks like more than 2 but less than 3 units, so I estimated it to be $\sqrt{5}$ units."	Response shows **incomplete understanding** with significant errors. One or two segments calculated with **incomplete explanation**. **Incorrect** response with explanation that shows **partial understanding.** E.g., "I drew tilted squares and triangles."	Response shows **limited understanding**. **Incorrect** response with **no explanation**.

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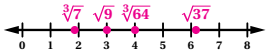
Problem 4

Standards: MA.8.NSO.1.1, MA.8.NSO.1.2, MTR.5.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response:  	Response shows **conceptual understanding** with minor errors. E.g., Response includes both: • $\sqrt{37}$ near the middle of 6 and 7. • $\sqrt[3]{7}$ somewhere in between 1.5 and 2.	Response shows **incomplete understanding** with significant errors. E.g., Response includes either: • $\sqrt{37}$ near the middle of 6 and 7. • $\sqrt[3]{7}$ somewhere in between 1.5 and 2.	Response shows **limited understanding**. **At least one** number is plotted correctly. **No** numbers are plotted correctly.

Problem 5

Standards: MA.8.A.2.3, MTR.4.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete** explanation. a. ***Responses vary.*** **$\sqrt[3]{n}$ represents the number that can be cubed to get n. This can't be found using division.** b. **2**	**Correct** response with **minor flaws in explanation**. **Incorrect** response with logical and **complete** explanation. E.g., Student writes that a cube root is not the same as division.	**Correct** response with **incomplete explanation**. **Incorrect** response with explanation that shows **partial understanding**.	**Incorrect** response with **no explanation**.

Name: ..... Date: ..... Period: .....

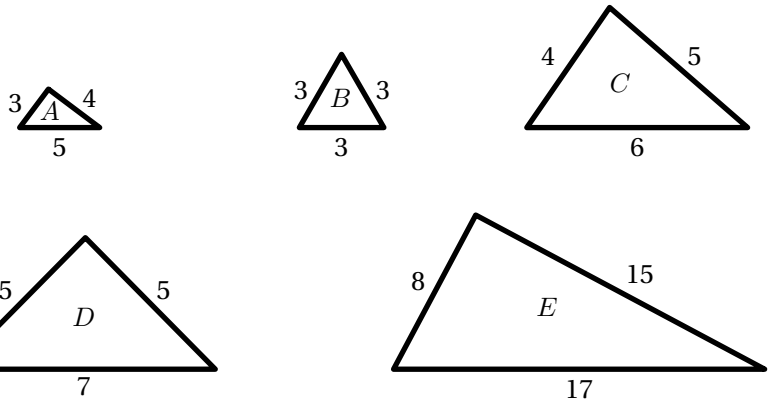
End-of-Unit Assessment

Unit 10

1. Select *all* the numbers that are solutions to the equation $x^3 = 27$.

- ☐ **A.** $\sqrt{27}$
- ☐ **B.** 3
- ☐ **C.** $\sqrt[3]{27}$
- ☐ **D.** 27^3
- ☐ **E.** 9

2. Circle *all* the right triangles.



3. Calculate the value of the expression $3(4^2 - 3) - \sqrt[3]{27}$.

4. Select *all* rational numbers.

- ☐ **A.** $-\sqrt{29}$
- ☐ **B.** $\frac{1}{7}$
- ☐ **C.** 4.54
- ☐ **D.** π^4
- ☐ **E.** $-\sqrt{25}$
- ☐ **F.** $\sqrt[3]{9}$

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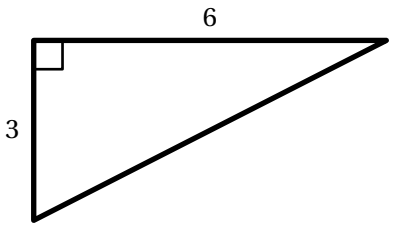
End-of-Unit Assessment (continued)

Unit 10

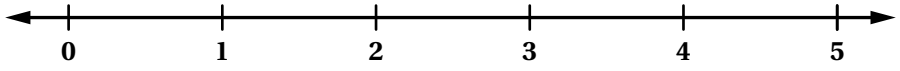
5. What is the exact length of the unlabeled side of this right triangle, in units?



6. Here are five numbers.

$\sqrt{1}$ $\sqrt{10}$ $\sqrt{16}$ $\sqrt[3]{9}$ $\sqrt[3]{27}$

a Plot these values on the number line:



b Chloe plotted $\sqrt{1}$ on the number line at $\frac{1}{2}$.

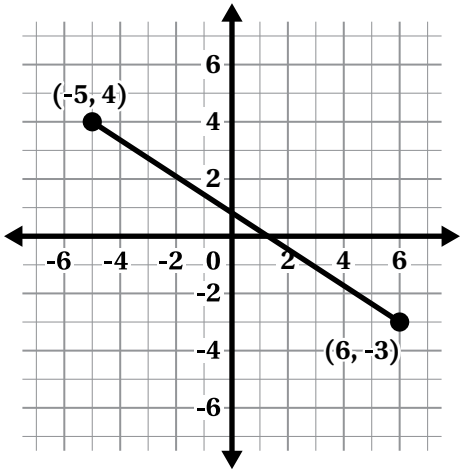
Explain how you know this cannot be the correct position for $\sqrt{1}$ on the number line.

End-of-Unit Assessment (continued)

Unit 10

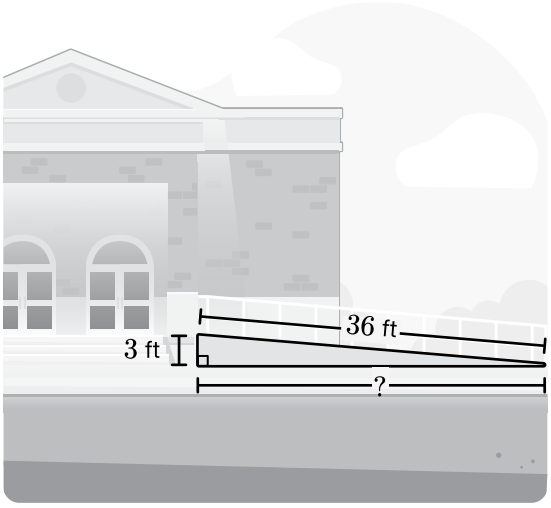
7. Exactly how many units long is the line segment between the points $(-5, 4)$ and $(6, -3)$?

Use the graph if it helps with your thinking.



8. The city of Metropolis is building a ramp at the entrance to the town hall. There is a rise of 3 feet to get from the sidewalk to the front door. For this height, the ramp must be 36 feet long to meet accessibility regulations.

Which expression represents the distance the ramp extends in feet?



A. $36^2 - 3^2$

B. $\sqrt{36^2 - 3^2}$

C. $3^2 + 36^2$

D. $\sqrt{3^2 + 36^2}$

Explain your thinking.

Standard	MA.8.NSO.1.1	MA.8.NSO.1.2	MA.8.NSO.1.7	MA.8.AR.2.3	MA.8.GR.1.1	MA.8.GR.1.2	MA.8.GR.1.3
Problem(s)	4, 6	6	3	1	5, 8	7	2

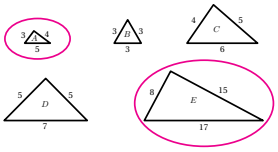
Problem 1

Standard: MA.8.AR.2.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Both correct choices and **no incorrect** choices. • 3 • $\sqrt[3]{27}$	**One correct** choice and **no incorrect** choices. **Both correct** choices and **one incorrect** choice.	**One correct** choice and **one incorrect** choice.	**Only incorrect** choices. **Two or more incorrect** choices with some correct choices.

Problem 2

Standards: MA.8.GR.1.3, MTR.5.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Both correct choices and **no incorrect** choices. 	**One correct** choice and **no incorrect** choices. **Both correct** choices and **one incorrect** choice.	**One correct** choice and **one incorrect** choice.	**Only incorrect** choices. **Two or more incorrect** choices with some correct choices.

Problem 3

Standard: MA.8.NSO.1.7

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: 36	Response shows **conceptual understanding** with minor errors. E.g., Students who write 12 may have multiplied 4 by 2 instead of squaring 4.	Response shows **incomplete understanding** with significant errors. E.g., Students who write 15 may have multiplied 4 by 2 instead of squaring 4 and may not have included the cube root term.	Response shows **limited understanding.**

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Problem 4

Standard: MA.8.NSO.1.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Both correct choices and **no incorrect** choices. • 4.54 • $-\sqrt{25}$	**One correct** choice and **no incorrect** choices. **Both correct** choice and **one incorrect** choice.	**One correct** choice and **one incorrect** choice.	**Only incorrect** choices. **Two or more incorrect** choices with some correct choices.

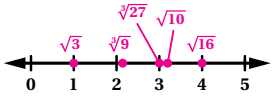
Problem 5

Standards: MA.8.GR.1.1, MTR.3.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $\sqrt{45}$ units (or equivalent)	Response shows **conceptual understanding** with minor errors. Students who write 45 may have correctly substituted the leg lengths into the Pythagorean theorem but did not account for the exponent on c^2 when solving.	Response shows **incomplete understanding** with significant errors. Students who write 9 or $\sqrt{9}$ may have added the leg lengths without squaring them first.	Response shows **limited understanding**.

Problem 6a

Standards: MA.8.NSO.1.1, MA.8.NSO.1.2, MTR.5.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response:  	Response shows **conceptual understanding** with minor errors. **Four out of five** values are correct on the number line.	Response shows **incomplete understanding** with significant errors. **Two or three out of five** values are correct on the number line.	Response shows **limited understanding**. **One or none of the five** values are correct on the number line.

Problem 6b

Standards: MA.8.NSO.1.1, MA.8.NSO.1.2, MTR.4.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: *Responses vary.* $\sqrt{1}$ cannot equal $\frac{1}{2}$ because $\left(\frac{1}{2}\right)^2$ is $\frac{1}{4}$, not 1.	Response shows **conceptual understanding** with minor errors. E.g., Response includes a minor calculation error in calculating 4^2.	Response shows **incomplete understanding** with significant errors. E.g., Response does not compare 4^2 to $\sqrt{8}$.	Response shows **limited understanding**.

Problem 7

Standards: MA.8.GR.1.2, MTR.5.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $\sqrt{170}$ units (or equivalent)	Response shows **conceptual understanding** with minor errors.	Response shows **incomplete understanding** with significant errors. Students who write $\sqrt{72}$ may have calculated $\sqrt{11^2 - 7^2}$ instead of $\sqrt{11^2 + 7^2}$.	Response shows **limited understanding**. Students who write 15 or 16 may have counted the number of square units that the line intersects on the grid.

Problem 8

Standards: MA.8.GR.1.1, MTR.6.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete explanation.** $\sqrt{36^2 - 3^2}$. *Explanations vary.* This situation has a right triangle where the hypotenuse is 36 feet long ($c = 36$) and one of the legs is 3 feet long ($a = 3$). Therefore, $3^2 + b^2 = 36^2$, so $b = \sqrt{36^2 - 3^2}$.	**Correct** response with **minor flaws in explanation**. E.g., Students write that they used the Pythagorean theorem. **Incorrect** response with logical and **complete explanation**.	**Correct** response with **incomplete explanation**. **Incorrect** response with explanation that shows **partial understanding**.	**Incorrect** response with **no explanation**.

Name: ..... Date: ..... Period: .....

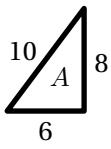
End-of-Unit Assessment

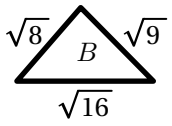
Unit 10

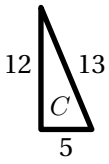
1. Select *all* the numbers that are solutions to the equation $x^3 = 8$.

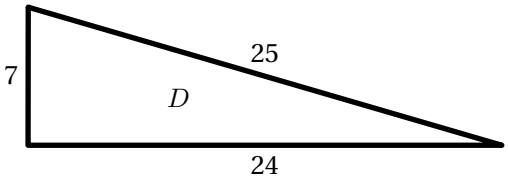
- ☐ **A.** $\sqrt{8}$
- ☐ **B.** 2
- ☐ **C.** $\sqrt[3]{8}$
- ☐ **D.** 8^3
- ☐ **E.** $\frac{8}{3}$

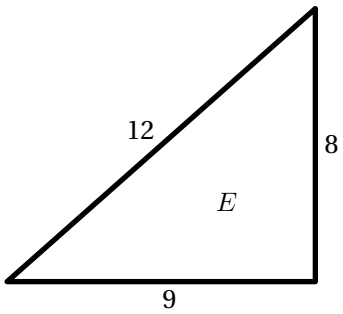
2. Circle *all* the right triangles.











3. Calculate the value of the expression $14.2 + (2^3 - 1) \times \sqrt{4}$.

4. Select *all* irrational numbers.

- ☐ **A.** $-\sqrt{23}$
- ☐ **B.** $\frac{2}{7}$
- ☐ **C.** $1.3333\ldots$
- ☐ **D.** $\sqrt{121}$
- ☐ **E.** $-\pi$
- ☐ **F.** $\sqrt[3]{8}$

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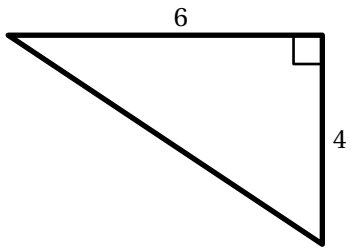
End-of-Unit Assessment (continued)

Unit 10

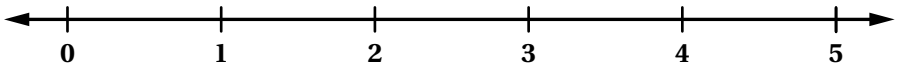
5. What is the exact length of the unlabeled side of this right triangle, in units?



6. Here are five numbers.

$\sqrt{2}$ $\sqrt{8}$ $\sqrt[3]{8}$ $\sqrt[3]{28}$ $\sqrt{16}$

a Plot these values on the number line:



b Kai plotted $\sqrt{8}$ on the number line at 4.

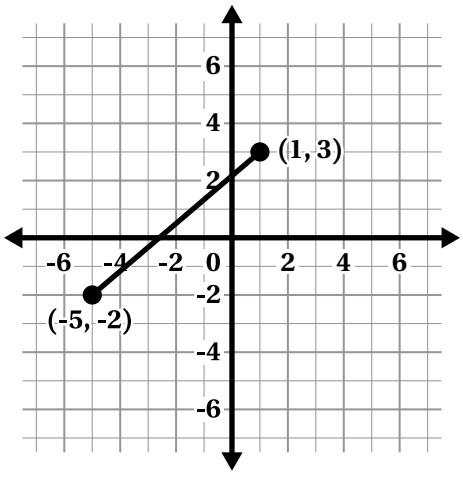
Explain how you know this cannot be the correct position for $\sqrt{8}$ on the number line.

End-of-Unit Assessment (continued)

Unit 10

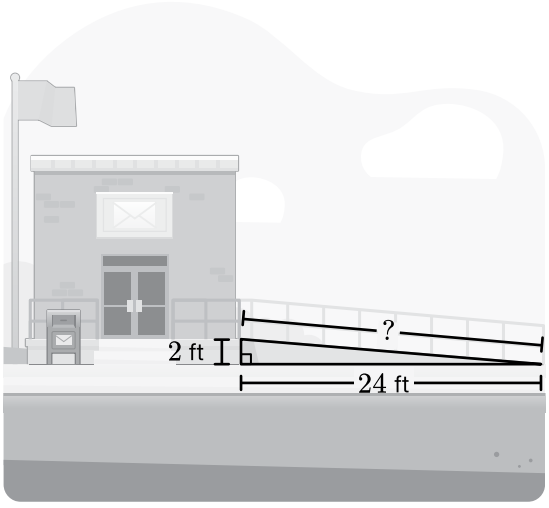
7. Exactly how many units long is the line segment between the points $(1, 3)$ and $(-5, -2)$?

Use the graph if it helps with your thinking.



8. Des-Town is building a ramp at the entrance to the post office. There is a rise of 2 feet to get from the sidewalk to the front door. For this height, the ramp must start 24 feet away to meet accessibility regulations.

Which expression represents the length of the ramp in feet?



A. $24^2 - 2^2$

B. $\sqrt{24^2 - 2^2}$

C. $2^2 + 24^2$

D. $\sqrt{2^2 + 24^2}$

Explain your thinking.

Standard	MA.8.NSO.1.1	MA.8.NSO.1.2	MA.8.NSO.1.7	MA.8.AR.2.3	MA.8.GR.1.1	MA.8.GR.1.2	MA.8.GR.1.3
Problem(s)	4, 6	6	3	1	5, 8	7	2

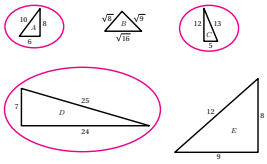
Problem 1

Standard: MA.8.AR.2.3

4 Meeting	3 Approaching	2 Developing	1 Beginning
Both correct choices and **no incorrect** choices. • 2 • $\sqrt[3]{8}$	**One correct** choice and **no incorrect** choices. **Both correct** choices and **one incorrect** choice.	**One correct** choice and **one incorrect** choice.	**Only incorrect** choices. **Two or more incorrect** choices with some correct choices.

Problem 2

Standards: MA.8.GR.1.3, MTR.5.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
All correct choices and **no incorrect** choices. 	**One or two correct** choices and **no incorrect** choices. **All correct** choices and **one incorrect** choice.	**One or two correct** choices and **one incorrect** choice.	**Only incorrect** choices. **Two or more incorrect** choices with some correct choices.

Problem 3

Standard: MA.8.NSO.1.7

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: 28.2	Response shows **conceptual understanding** with minor errors. E.g., Students who write 24.2 may have multiplied 2 by 3 instead of cubing 2.	Response shows **incomplete understanding** with significant errors. E.g., Students who write 34.2 may have multiplied 2 by 3 instead of cubing 2 and may have multiplied by 4 instead of the square root of 4.	Response shows **limited understanding.**

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Problem 4

Standards: MA.8.NSO.1.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Both correct choices and **no incorrect** choices. • $-\sqrt{23}$ • $-\pi$	**One correct** choice and **no incorrect** choices. **Both correct** choice and **one incorrect** choice.	**One correct** choice and **one incorrect** choice.	**Only incorrect** choices. **Two or more incorrect** choices with some correct choices.

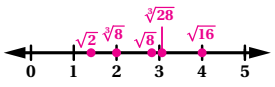
Problem 5

Standards: MA.8.GR.1.1, MTR.3.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $\sqrt{52}$ units (or equivalent)	Response shows **conceptual understanding** with minor errors. Students who write 52 may have correctly substituted the leg lengths into the Pythagorean theorem but did not account for the exponent on c^2 when solving.	Response shows **incomplete understanding** with significant errors. Students who write 10 or $\sqrt{10}$ may have added the leg lengths without squaring them first.	Response shows **limited understanding**.

Problem 6a

Standards: MA.8.NSO.1.1, MA.8.NSO.1.2, MTR.5.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: 	Response shows **conceptual understanding** with minor errors. **Four out of five** values are correct on the number line.	Response shows **incomplete understanding** with significant errors. **Two or three out of five** values are correct on the number line.	Response shows **limited understanding**. **One or none of the five** values are correct on the number line.

Problem 6b

Standards: MA.8.NSO.1.1, MA.8.NSO.1.2, MTR.4.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: *Responses vary.* $\sqrt{8}$ cannot equal 4 because 4^2 is 16, not 8.	Response shows **conceptual understanding** with minor errors. E.g., Response includes a minor calculation error in calculating 4^2.	Response shows **incomplete understanding** with significant errors. E.g., Response does not compare 4^2 to $\sqrt{8}$.	Response shows **limited understanding**.

Problem 7

Standards: MA.8.GR.1.2, MTR.5.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $\sqrt{61}$ units (or equivalent)	Response shows **conceptual understanding** with minor errors.	Response shows **incomplete understanding** with significant errors. Students who write 1 may have calculated $\sqrt{6^2 - 5^2}$ instead of $\sqrt{6^2 - 5^2}$.	Response shows **limited understanding**. Students who write 9 or 10 may have counted the number of square units that the line intersects on the grid.

Problem 8

Standards: MA.8.GR.1.1, MTR.6.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response and **complete explanation.** $\sqrt{24^2 + 2^2}$. *Explanations vary.* This situation has a right triangle where one of the legs is 2 feet long ($a = 2$) and the other leg is 24 feet long ($b = 24$). Therefore, $2^2 + 24^2 = c^2$, so $c = \sqrt{2^2 + 24^2}$.	**Correct** response with **minor flaws in explanation**. **Incorrect** response with logical and **complete explanation**. E.g., Students write that they used the Pythagorean theorem.	**Correct** response with **incomplete explanation**. **Incorrect** response with explanation that shows **partial understanding**.	**Incorrect** response with **no explanation**.

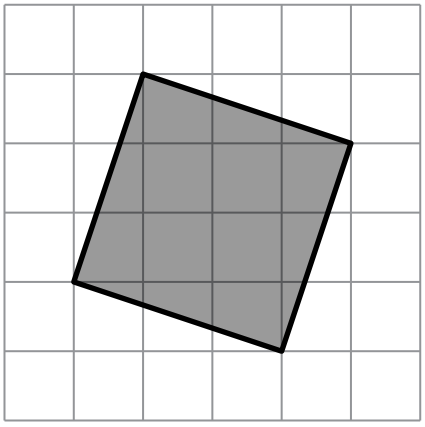
Unit 10
Show What You Know PDFs

Name: Date: Period:

Show What You Know

10.01

Determine the area of the tilted square.



Explain your thinking.

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Name: Date: Period:

Show What You Know

10.02

Complete the table for each square.

Square	Side Length (units)	Area (sq. units)
A		100
B		95
C	6	
D		30

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Name: Date: Period:

Show What You Know

10.03

Precious is approximating the value of $\sqrt{18}$.
What value might make sense to try next?

Explain your thinking.

Precious

n	n^2
4.1	16.81
4.2	17.64
4.3	18.49
?	

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Name: Date: Period:

Show What You Know

10.04

Select *all* the numbers greater than 6 and less than 7.

- ☐ **A.** $\sqrt{6.5}$
- ☐ **B.** $\sqrt{15}$
- ☐ **C.** $\sqrt{38}$
- ☐ **D.** $\sqrt{47}$
- ☐ **E.** $\sqrt{60}$

Explain your thinking.

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Name: Date: Period:

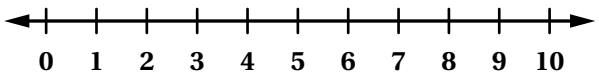
Show What You Know

10.05

Here is an equation: $x^3 = 24$.

a Write the exact solution.

b Plot the solution on the number line.



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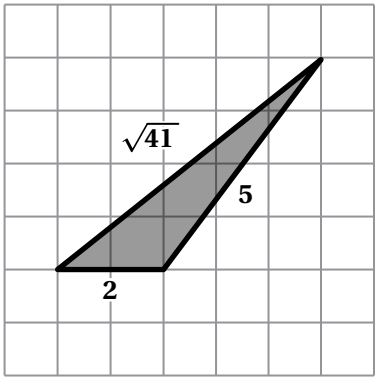
Name: Date: Period:

Show What You Know

10.06

Is $a^2 + b^2 = c^2$ true for this triangle? Circle one.



Yes No I'm not sure

Show or explain your thinking.

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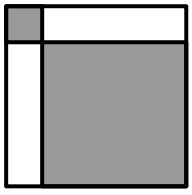
Name: Date: Period:

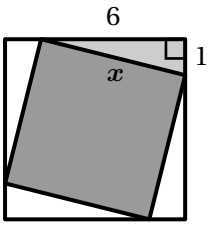
Show What You Know

10.07

Calculate the value of x.

Mark the diagram if it helps with your thinking.





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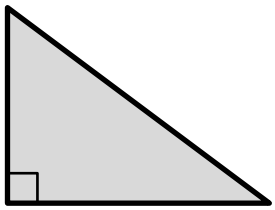
Name: Date: Period:

Show What You Know

10.08

This right triangle has side lengths of 3, 4, and x units.



a If x is the length of the hypotenuse, what is its exact value?

b If x is the length of a leg, what is its exact value?

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Name: Date: Period:

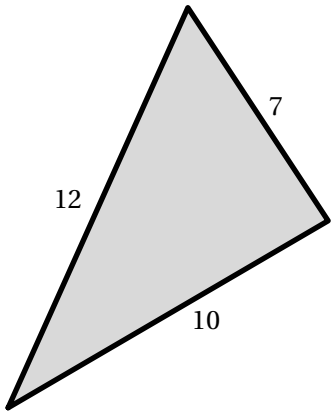
Show What You Know

10.09

Is this a right triangle? Circle one.

Yes No

Show or explain your thinking.



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Name: Date: Period:

Show What You Know

10.10

Select *all* the groups of segments that will form a triangle.

- ☐ **A.** 1, 2, and 5 units
- ☐ **B.** 6, 11, and 6 units
- ☐ **C.** 12, 8, and 9 units
- ☐ **D.** 3, 3, and 7 units
- ☐ **E.** 8, 15, and 6 units

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Name: Date: Period:

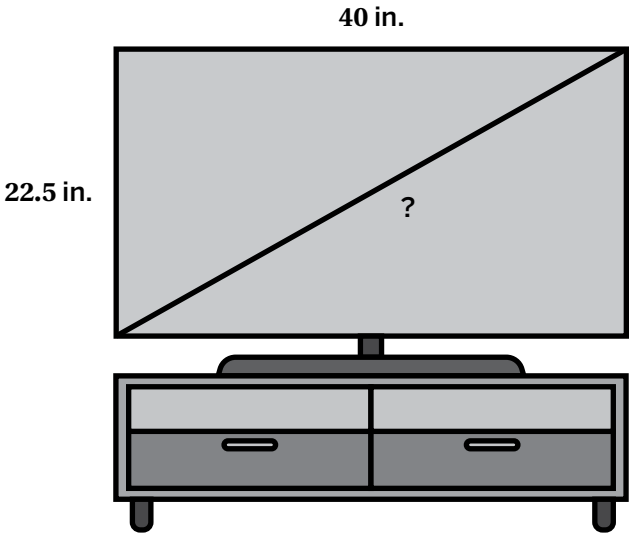
Show What You Know

10.11

The size of a television screen is measured by the length of its diagonal.

This television screen is 22.5 inches tall and 40 inches wide.

What is the length of its diagonal?



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Name: Date: Period:

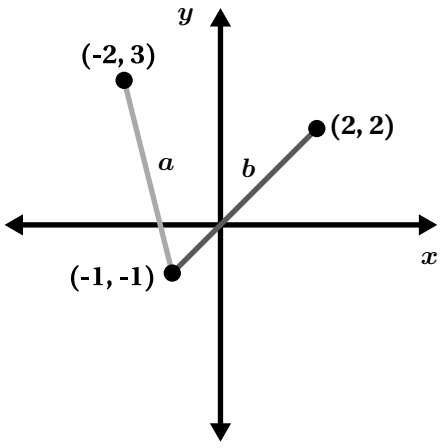
Show What You Know

10.12

The graph shows two line segments: a and b.

What is the length of each segment?

Segment	Length (units)
a	
b	



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Name: Date: Period:

Show What You Know

10.13

Complete the table.

Fraction	Decimal	Mixed Number	Percent
$\frac{12}{5}$			
			$200.\underline{64}\%$
		$\frac{51}{400}$	112.75

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Name: Date: Period:

Show What You Know

10.14

Write *two* examples of a rational number and *two* examples of an irrational number in the table.

Rational Numbers	Irrational Numbers

Explain how you know your examples are rational or irrational.

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Name: Date: Period:

Show What You Know

10.15

A family goes on a road trip. The total distance of the round-trip is 600 miles. Their car gets 25 miles per gallon (MPG), and the price of gas is $\$4$ per gallon. Along the way, they encounter three toll stops: the first toll costs $\$3.50$, the second costs $\$5.25$, and the third costs $\$4.75$. Which expression represents how to calculate the total cost of the trip?

A. $\frac{600}{4} \cdot 25 + 3.50 + 5.25 + 4.75$

B. $\frac{4 \cdot 25}{500} + 3.50 + 5.25 + 4.75$

C. $600 \cdot 25 \cdot 4 + 3.50 + 5.25 + 4.75$

D. $\frac{600}{25} \cdot 4 + 3.50 + 5.25 + 4.75$

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Name: Date: Period:

Show What You Know

10.16

Tina simplified an expression. Her work is shown.

$$\frac{5^2}{2+3} + 3^3 \times \frac{\sqrt{10^2 - 19}}{3}$$

$$\frac{25}{5} + 3^3 \times \frac{\sqrt{81}}{3}$$

$$\frac{25}{5} + 27 \times \frac{9}{3}$$

$$5 + 27 \times 3$$

$$32 \times 3$$

$$96$$

What did Tina do well? What mistake did Tina make? Explain your answers with words and numbers.

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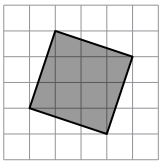
Show What You Know **Lesson 1**

Name: _____ Date: _____ Period: _____

Show What You Know 10.01

Determine the area of the tilted square.

10 square units



Explain your thinking.

Explanations vary. I found the area of a larger square that surrounds the tilted square and then subtracted the area of the four congruent triangles around the tilted square.

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Show What You Know **Lesson 2**

Name: _____ Date: _____ Period: _____

Show What You Know 10.02

Complete the table for each square.

Square	Side Length (units)	Area (sq. units)
A	$\sqrt{100}$ or 10	100
B	$\sqrt{95}$	95
C	6	36
D	$\sqrt{30}$	30

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Show What You Know **Lesson 3**

Name: _____ Date: _____ Period: _____

Show What You Know 10.03

Precious is approximating the value of $\sqrt{18}$. What value might make sense to try next?

Decimal responses between 4.2 and 4.3 are considered correct.

Explain your thinking.

Explanations vary. Precious is looking for a value of n such that n^2 is as close to 18 as possible. Since 4.3^2 is greater than 18 and 4.2^2 is less than 18, Precious should choose a value between those numbers, such as 4.25.

Precious

n	n^2
4.1	16.81
4.2	17.64
4.3	18.49
?	

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Show What You Know **Lesson 4**

Name: _____ Date: _____ Period: _____

Show What You Know 10.04

Select *all* the numbers greater than 6 and less than 7.

- ☐ A. $\sqrt{6.5}$
- ☐ B. $\sqrt{15}$
- ☑ C. $\sqrt{38}$
- ☑ D. $\sqrt{47}$
- ☐ E. $\sqrt{60}$

Explain your thinking.

Explanations vary. Since $6^2 = 36$ and $7^2 = 49$, the square roots of values between 36 and 49 will be between 6 and 7.

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Show What You Know **Lesson 5**

Name: _____ Date: _____ Period: _____

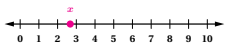
Show What You Know 10.05

Here is an equation: $x^3 = 24$.

a. Write the exact solution.

$x = \sqrt[3]{24}$

b. Plot the solution on the number line.



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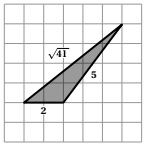
Show What You Know **Lesson 6**

Name: _____ Date: _____ Period: _____

Show What You Know 10.06

Is $a^2 + b^2 = c^2$ true for this triangle? Circle one.

Yes (No) I'm not sure



Show or explain your thinking.

Explanations vary.

- This is not a right triangle, so the Pythagorean theorem does not apply.
- $2^2 + 5^2 = 29$ and $(\sqrt{41})^2 = 41$. Since $29 \neq 41$, $a^2 + b^2 = c^2$ is not true for this triangle.

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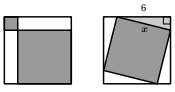
Show What You Know **Lesson 7**

Name: _____ Date: _____ Period: _____

Show What You Know 10.07

Calculate the value of x.

Mark the diagram if it helps with your thinking.



$\sqrt{37}$. *Work varies.*

$1^2 + 6^2 = x^2$

$1 + 36 = x^2$

$37 = x^2$

$\sqrt{37} = x$

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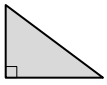
Show What You Know **Lesson 8**

Name: _____ Date: _____ Period: _____

Show What You Know 10.08

This right triangle has side lengths of 3, 4, and x units.



a. If x is the length of the hypotenuse, what is its exact value?

5. *Work varies.*

$3^2 + 4^2 = x^2$

$9 + 16 = x^2$

$\sqrt{25} = x$

$5 = x$

b. If x is the length of a leg, what is its exact value?

$\sqrt{7}$. *Work varies.*

$3^2 + x^2 = 4^2$

$9 + x^2 = 16$

$x^2 = 7$

$x = \sqrt{7}$

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Show What You Know **Lesson 9**

Name: _____ Date: _____ Period: _____

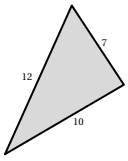
Show What You Know 10.09

Is this a right triangle? Circle one.

Yes (No)

Show or explain your thinking.

Explanations vary. $7^2 + 10^2$ **is not equal to** 12^2**.**



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Show What You Know **Lesson 10**

Name: _____ Date: _____ Period: _____

Show What You Know 10.10

Select *all* the groups of segments that will form a triangle.

- ☑ **A.** 1, 2, and 5 units
- ☐ **B.** 6, 11, and 6 units
- ☐ **C.** 12, 8, and 9 units
- ☐ **D.** 3, 3, and 7 units
- ☑ **E.** 8, 15, and 6 units

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Show What You Know **Lesson 11**

Name: _____ Date: _____ Period: _____

Show What You Know 10.11

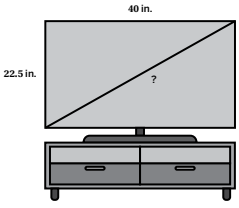
The size of a television screen is measured by the length of its diagonal.

This television screen is 22.5 inches tall and 40 inches wide.

What is the length of its diagonal?

About 45.9 inches (or equivalent). Work varies.

$\sqrt{22.5^2 + 40^2} \approx 45.9$



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Show What You Know **Lesson 12**

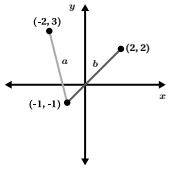
Name: _____ Date: _____ Period: _____

Show What You Know 10.12

The graph shows two line segments: a and b.

What is the length of each segment?

Segment	Length (units)
a	$\sqrt{17}$
b	$\sqrt{18}$



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Show What You Know **Lesson 13**

Name: _____ Date: _____ Period: _____

Show What You Know 10.13

Complete the table.

Fraction	Decimal	Mixed Number	Percent
$\frac{12}{5}$	2.4	$2\frac{2}{5}$	240%
$-\frac{262}{99}$	$-2.\overline{64}$	$-2\frac{64}{99}$	$-200.\overline{64}\%$
$\frac{451}{400}$	1.1275	$1\frac{51}{400}$	112.75%

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Show What You Know **Lesson 14**

Name: _____ Date: _____ Period: _____

Show What You Know 10.14

Write *two* examples of a rational number and *two* examples of an irrational number in the table. ***Responses vary.***

Rational Numbers	Irrational Numbers
3	$\sqrt{101}$
0.7	$\sqrt[3]{2}$

Explain how you know your examples are rational or irrational.

3 and 0.7 can both be written as fractions $\frac{3}{1}$ and $\frac{7}{10}$. $\sqrt{101}$ and $\sqrt[3]{2}$ cannot be written as fractions.

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Show What You Know **Lesson 15**

Name: _____ Date: _____ Period: _____

Show What You Know 10.15

A family goes on a road trip. The total distance of the round-trip is 600 miles. Their car gets 25 miles per gallon (MPG), and the price of gas is $4 per gallon. Along the way, they encounter three toll stops: the first toll costs $3.50, the second costs $5.25, and the third costs $4.75. Which expression represents how to calculate the total cost of the trip?

A. $\frac{600}{4} \cdot 25 + 3.50 + 5.25 + 4.75$

B. $\frac{4 \cdot 25}{500} + 3.50 + 5.25 + 4.75$

C. $600 \cdot 25 \cdot 4 + 3.50 + 5.25 + 4.75$

D. $\frac{600}{25} \cdot 4 + 3.50 + 5.25 + 4.75$

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Show What You Know **Lesson 16**

Name: _____ Date: _____ Period: _____

Show What You Know 10.16

Tina simplified an expression. Her work is shown.

$$\frac{5^2}{2+3} + 3^3 \times \frac{\sqrt{10^2 - 19}}{3}$$
$$\frac{25}{5} + 3^3 \times \frac{\sqrt{81}}{3}$$
$$\frac{25}{5} + 27 \times \frac{9}{3}$$
$$5 + 27 \times 3$$
$$32 \times 3$$
$$96$$

What did Tina do well? What mistake did Tina make? Explain your answers with words and numbers.

Responses vary. Tina simplified the fractions correctly. However, she made a mistake in the last steps of her calculation. Instead of multiplying 27 by 3 first, she added 5 and 27. The correct value is 86, not 96.

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Unit 11
Assessments and Rubrics

Name: ..... Date: ..... Period: .....

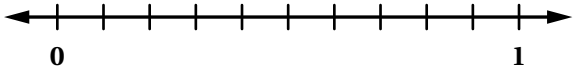
Pre-Unit Check

Unit 11

1. You look at the weather forecast and it says 80% chance of 1 inch of snow today.

Would you wear snow boots? Explain your thinking.

2. Plot and label each number on the number line: 0.7, $\frac{3}{4}$, 0.4, 0.3, $\frac{9}{10}$.



3. Complete the table so that each row has an equivalent fraction, decimal, and percent.

Fraction	Decimal	Percent
	0.5	50%
$\frac{2}{5}$	0.4	
$\frac{5}{8}$		62.5%
$\frac{3}{10}$		30%

4. Jasmine surveyed 20 students at her middle school. 7 of them had at least one pet.

a What percent of the students surveyed have at least one pet?

b There are 400 students at Jasmine's middle school. If the rest of the school is consistent with these results, about how many students would have at least one pet?

c Explain your thinking.

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Pre-Unit Check (continued)

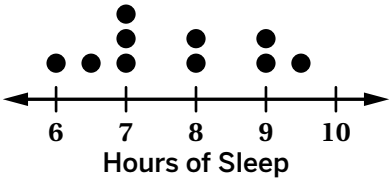
Unit 11

5. **a** What do you know about finding the mean and median?

b How do you calculate the IQR for a set of data?

c What do you still wonder about mean, median, or IQR?

6. Zoe wants to know how long students at her after school program sleep. She asked 10 students how many hours they slept last night and recorded their answers in a line plot.



a How many students slept for 7 or fewer hours last night?

b Calculate the median number of hours that all 10 students slept?

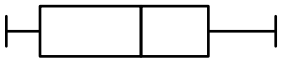
c Do you think the median you calculated is similar to the median of all the students in Zoe's after school program? Explain your reasoning.

7. There are 11 plants in a garden. Their heights (in inches) are:

$$4.5, 5.5, 7, 4.5, 8, 9.5, 6, 8, 7.5, 8, 6$$

a What is the median height of these plants?

b Determine the first quartile, median, and third quartile of the plants' heights. Label them on the box plot.



c What is the interquartile range (IQR) of the plants' heights?

Name: ..... Date: ..... Period: .....

End-of-Unit Assessment

Unit 11

1. Maurice is spinning a spinner with 3 equal sections labeled A, B, and C twice. What are all possible outcomes in the sample space?

2. A fair coin is tossed three times. What is the probability of getting at least two tails?

A. $\frac{1}{8}$

B. $\frac{3}{8}$

C. $\frac{1}{2}$

D. $\frac{3}{4}$

3. McKenzie rolls a fair 6-sided die 300 times.

Select *all* the true statements.

- ☐ **A.** McKenzie will roll a 3 about 50 times.
- ☐ **B.** McKenzie will roll a 4 or 5 about 100 times.
- ☐ **C.** McKenzie will roll a 2 about 100 times.
- ☐ **D.** McKenzie will roll a 1 or 6 about 150 times.
- ☐ **E.** McKenzie will roll a 6 about 150 times.

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4. There are 3 green, 2 orange, and 1 white same-sized slips of paper in a hat. A slip of paper is randomly drawn from the hat twice, with replacement. What is the theoretical probability of drawing one green slip of paper and then one orange slip of paper?

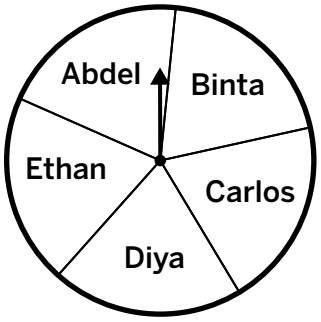
(A) $\frac{1}{6}$

(B) $\frac{1}{3}$

(C) $\frac{2}{3}$

(D) $\frac{5}{6}$

5. Five students share classroom duties. A teacher is spinning this spinner twice to determine the two students who will perform the classroom duties today.



Fill in the chart to represent the sample space.

	Abdel (A)	Binta (B)	Carlos (C)	Diya (D)	Ethan (E)
Abdel (A)					
Binta (B)					
Carlos (C)					
Diya (D)					
Ethan (E)					

6. Daniel flips a fair coin 200 times. What is a reasonable prediction on how many times he will flip a tail?

(A) 0
(B) 50
(C) 100
(D) 200

Mia is drawing a card from a stack with 4 equal-sized cards numbered 1–4 twice, with replacement.

7. What are all of the possible outcomes in the sample space?

8. What is the probability that the sum of the two outcomes is at least 4?

Standard	MA.8.DP.2.1	MA.8.DP.2.2	MA.8.DP.2.3
Problem(s)	1, 5, 7	2, 4	3, 6, 8

Problem 1

Standards: MA.8.DP.2.1, MTR.4.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: AA, AB, AC, BA, BB, BC, CA, CB, CC	Response shows **conceptual understanding** with minor errors.	Response shows **incomplete understanding** with significant errors. Students who write A, B, C may have only considered spinning the spinner one time.	Response shows **limited understanding.**

Problem 2

Standards: MA.8.DP.2.2, MTR.3.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: C. $\frac{1}{2}$			**Incorrect** choice. Students who select $\frac{3}{8}$ may have found the probability of tossing two tails instead of tossing *at least* two tails.

Problem 3

Standards: MA.8.DP.2.3, MTR.5.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Both correct choices and **no incorrect** choices. A. McKenzie will roll a 3 about 50 times. B. McKenzie will roll a 4 or 5 about 100 times.	**One correct** choice and **no incorrect** choices. **Both correct** choices and **one incorrect** choice.	**One correct** choice and **one incorrect** choice.	**Only incorrect** choices. **Two or more incorrect** choices with **some correct** choices.

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Problem 4

Standards: MA.8.DP.2.2, MTR.3.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: A. $\frac{1}{6}$			**Incorrect** choice. Students who select $\frac{1}{3}$ may have found the probability of drawing an orange slip of paper instead of drawing one green slip of paper and then one orange slip of paper.

Problem 5

Standards: MA.8.DP.2.1, MTR.7.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response:	Response shows **conceptual understanding** with minor errors.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding**.

	Abdel (A)	Binta (B)	Carlos (C)	Diya (D)	Ethan (E)
Abdel (A)	AA	AB	AC	AD	AE
Binta (B)	BA	BB	BC	BD	BE
Carlos (C)	CA	CB	CC	CD	CE
Diya (D)	DA	DB	DC	DD	DE
Ethan (E)	EA	EB	EC	ED	EE

Problem 6

Standards: MA.8.DP.2.3, MTR.5.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: **C. 100**			**Incorrect** choice. Students who select 50 may think there are 4 possible results of flipping a coin; however, there are 2 possible results.

Problem 7

Standards: MA.8.DP.2.1, MTR.4.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: **11, 12, 13, 14, 21, 22, 23, 24, 31, 32, 33, 34, 41, 42, 43, 44**	Response shows **conceptual understanding** with minor errors.	Response shows **incomplete understanding** with significant errors. Students who write 1, 2, 3, 4 may have only considered drawing one card from the stack.	Response shows **limited understanding**.

Problem 8

Standards: MA.8.DP.2.3, MTR.5.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $\frac{13}{16}$ **(or equivalent)**			**Incorrect** choice. Students who write $\frac{3}{16}$ may have found the probability that the sum of the two outcomes is 4 instead of *at least* 4.

Name: ..... Date: ..... Period: .....

End-of-Unit Assessment

Unit 11

1. Lydia is spinning a spinner with 4 equal sections labeled A, B, C, and D twice. What are all of the possible outcomes in the sample space?

2. A quiz contains 3 true-false questions. What is the probability that a student guesses at least one correct answer?

A. $\frac{1}{8}$

B. $\frac{1}{2}$

C. $\frac{3}{4}$

D. $\frac{7}{8}$

3. Jade rolls a fair 6-sided die 450 times.

Select *all* the true statements.

- ☐ **A.** Jade will roll a 1 about 45 times.
- ☐ **B.** Jade will roll a 2 or 3 about 90 times.
- ☐ **C.** Jade will roll a 4 about 75 times.
- ☐ **D.** Jade will roll a 5 or 6 about 150 times.
- ☐ **E.** Jade will roll a 5 about 150 times.

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4. There are 5 blue, 1 yellow, and 4 red tiles in a bag. A tile is randomly drawn from the bag twice, with replacement. What is the theoretical probability of drawing one blue tile and then one red tile?

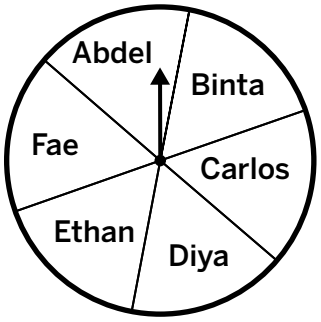
A. $\frac{1}{10}$

B. $\frac{1}{5}$

C. $\frac{2}{5}$

D. $\frac{1}{2}$

5. Six students share classroom duties. A teacher is spinning this spinner twice to determine the two students who will perform the classroom duties today.



Fill in the chart to represent the sample space.

	Abdel (A)	Binta (B)	Carlos (C)	Diya (D)	Ethan (E)	Fae (F)
Abdel (A)						
Binta (B)						
Carlos (C)						
Diya (D)						
Ethan (E)						
Fae (F)						

End-of-Unit Assessment (continued)

6. Bryce flips a fair coin 400 times. What is a reasonable prediction on how many times he will flip a head?

(A) 0

(B) 100

(C) 200

(D) 400

Lucy is drawing a card from a stack with 5 equal-sized cards numbered 1–5 twice, with replacement.

7. What are all of the possible outcomes in the sample space?

8. What is the probability that the sum of the two outcomes is greater than 5?

Standard	MA.8.DP.2.1	MA.8.DP.2.2	MA.8.DP.2.3
Problem(s)	1, 5, 7	2, 4	3, 6, 8

Problem 1

Standards: MA.8.DP.2.1, MTR.4.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: AA, AB, AC, AD, BA, BB, BC, BD, CA, CB, CC, CD, DA, DB, DC, DD	Response shows **conceptual understanding** with minor errors.	Response shows **incomplete understanding** with significant errors. Students who write A, B, C, D may have only considered spinning the spinner one time.	Response shows **limited understanding**.

Problem 2

Standards: MA.8.DP.2.2, MTR.3.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: D. $\frac{7}{8}$			**Incorrect** choice. Students who select $\frac{1}{2}$ may have found the probability of the student guessing one question correctly instead of guessing *at least* one question correctly.

Problem 3

Standards: MA.8.DP.2.3, MTR.5.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Both correct choices and **no incorrect** choices. C. Jade will roll a 4 about 75 times. D. Jade will roll a 5 or 6 about 150 times.	**One correct** choice and **no incorrect** choices. **Both correct** choices and **one incorrect** choice.	**One correct** choice and **one incorrect** choice.	**Only incorrect** choices. **Two or more incorrect** choices with **some correct** choices.

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Problem 4

Standards: MA.8.DP.2.2, MTR.3.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: B. $\frac{1}{5}$			**Incorrect** choice. Students who select $\frac{2}{5}$ may have found the probability of drawing a red tile instead of drawing one blue tile and then one red tile.

Problem 5

Standards: MA.8.DP.2.1, MTR.7.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response:	Response shows **conceptual understanding** with minor errors.	Response shows **incomplete understanding** with significant errors.	Response shows **limited understanding**.

	Abdel (A)	Binta (B)	Carlos (C)	Diya (D)	Ethan (E)	Fae (F)
Abdel (A)	AA	AB	AC	AD	AE	AF
Binta (B)	BA	BB	BC	BD	BE	BF
Carlos (C)	CA	CB	CC	CD	CE	CF
Diya (D)	DA	DB	DC	DD	DE	DF
Ethan (E)	EA	EB	EC	ED	EE	EF
Fae (F)	FA	FB	FC	FD	FE	FF

Problem 6

Standards: MA.8.DP.2.3, MTR.5.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct choice: **C. 200**			**Incorrect** choice. Students who select 100 may think there are 4 possible results of flipping a coin; however, there are 2 possible results.

Problem 7

Standards: MA.8.DP.2.1, MTR.4.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: **11, 12, 13, 14, 15, 21, 22, 23, 24, 25, 31, 32, 33, 34, 35, 41, 42, 43, 44, 45, 51, 52, 53, 54, 55**	Response shows **conceptual understanding** with minor errors.	Response shows **incomplete understanding** with significant errors. Students who write 1, 2, 3, 4, 5 may have only considered drawing one card from the stack.	Response shows **limited understanding**.

Problem 8

Standards: MA.8.DP.2.3, MTR.5.1

4 Meeting	3 Approaching	2 Developing	1 Beginning
Correct response: $\frac{3}{5}$ **(or equivalent)**			**Incorrect** choice. Students who write $\frac{4}{25}$ may have found the probability that the sum of the two outcomes is 5 instead of *greater than* 5.

Unit 11
Show What You Know PDFs

Name: Date: Period:

Show What You Know

11.01

A bag contains 4 marbles — 2 are red, 1 is blue, and 1 is green. What is the sample space for the repeated experiment of choosing one marble at random from the bag, replacing it, then choosing another marble?

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Name: Date: Period:

Show What You Know

11.02

Draw a tree diagram or use a table to create the sample space for flipping a coin 2 times.

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Name: Date: Period:

Show What You Know

11.03

The digits 0 to 6 are written on 7 cards such that each card contains a unique digit. You pick a card, replace it in the deck, and pick a second card. What is P (same number)?

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Name: Date: Period:

Show What You Know

11.04

The table shows the results for 10 trials of rolling a number cube twice. Use the results to determine the experimental probability of at least one roll being 4.

Trial	RESULT
1	6, 4
2	1, 5
3	4, 5
4	2, 6
5	5, 4

Trial	RESULT
6	5, 4
7	2, 1
8	3, 2
9	6, 6
10	4, 1

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Name: Date: Period:

Show What You Know

11.05

If you rolled a die 120 times, how many times would you expect it to land on an even number?

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Show What You Know **Lesson 1**

Name: _____ Date: _____ Period: _____

Show What You Know 11.01

A bag contains 4 marbles — 2 are red, 1 is blue, and 1 is green. What is the sample space for the repeated experiment of choosing one marble at random from the bag, replacing it, then choosing another marble?

R1 R1, R1 R2, R1 B1, R1 G1
R2 R1, R2 R2, R2 B1, R2 G1
B1 R1, B1 R2, B1 B1, B1 G1
G1 R1, G1 R2, G1 B1, G1 G1

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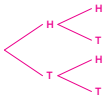
Show What You Know **Lesson 2**

Name: _____ Date: _____ Period: _____

Show What You Know 11.02

Draw a tree diagram or use a table to create the sample space for flipping a coin 2 times.



OR

	H	T
H	HH	HT
T	HT	TT

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Show What You Know **Lesson 3**

Name: _____ Date: _____ Period: _____

Show What You Know 11.03

The digits 0 to 6 are written on 7 cards such that each card contains a unique digit. You pick a card, replace it in the deck, and pick a second card. What is P (same number)?

$\frac{1}{7}$ or about 14%

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Show What You Know **Lesson 4**

Name: _____ Date: _____ Period: _____

Show What You Know 11.04

The table shows the results for 10 trials of rolling a number cube twice. Use the results to determine the experimental probability of at least one roll being 4.

Trial	RESULT	Trial	RESULT
1	6, 4	6	5, 4
2	1, 5	7	2, 1
3	4, 5	8	3, 2
4	2, 6	9	6, 6
5	5, 4	10	4, 1

$\frac{1}{2}$ or 50%

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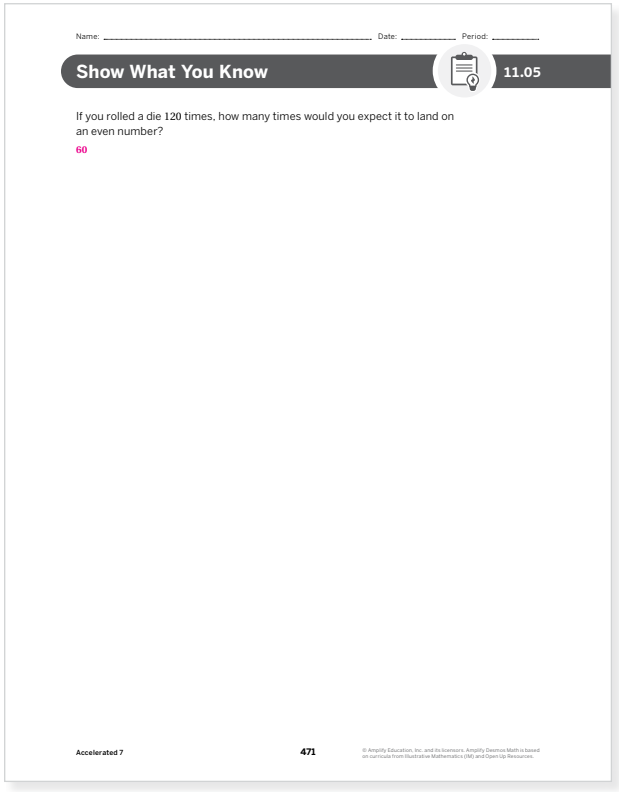
Show What You Know **Lesson 5**



Name: _____ Date: _____ Period: _____

Show What You Know 11.05

If you rolled a die 120 times, how many times would you expect it to land on an even number?

60

Accelerated 7 471

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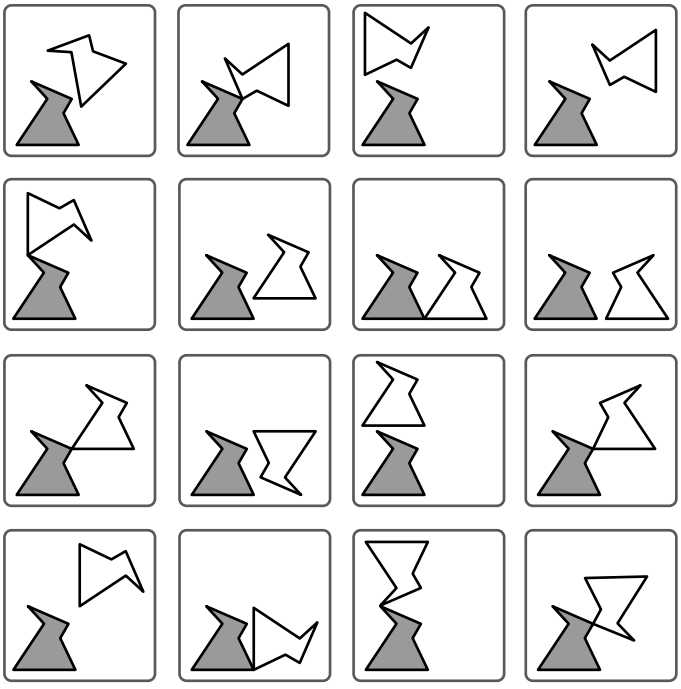
Lesson Resources

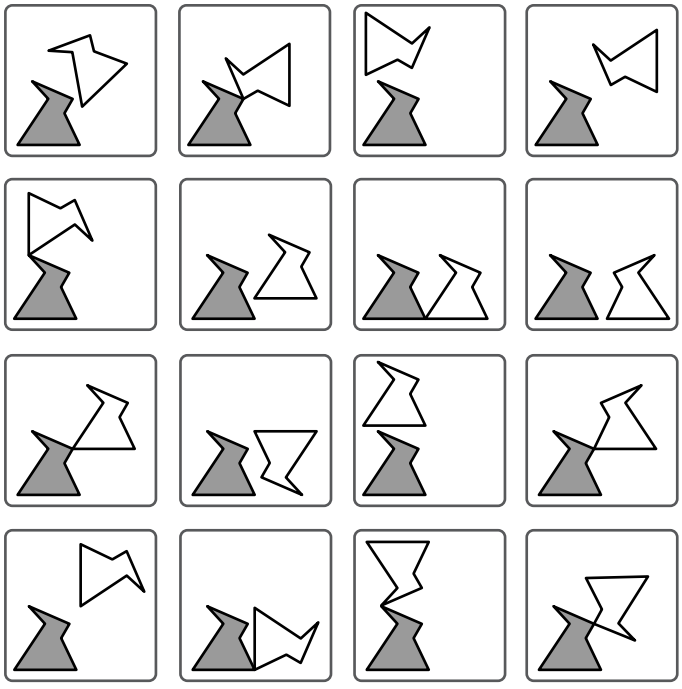
Unit 1
Activity Sheets and Cards

Polygraph Set A

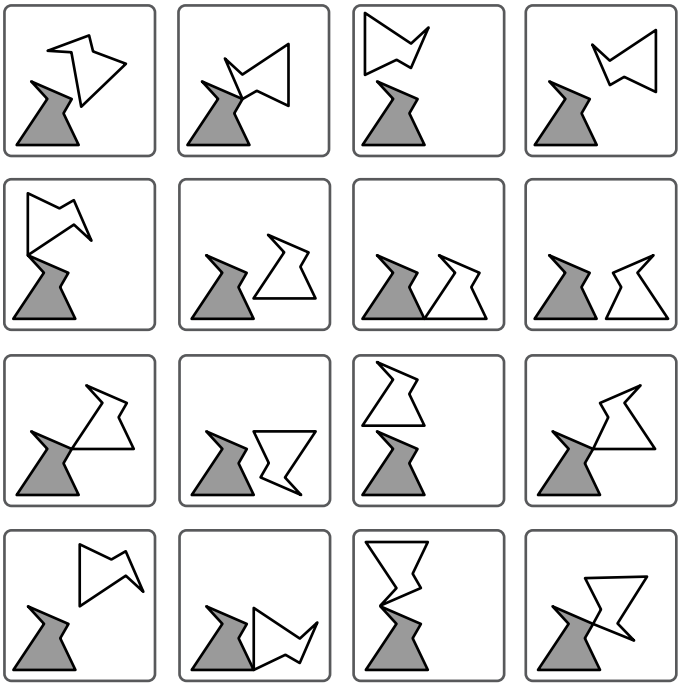
Round 1



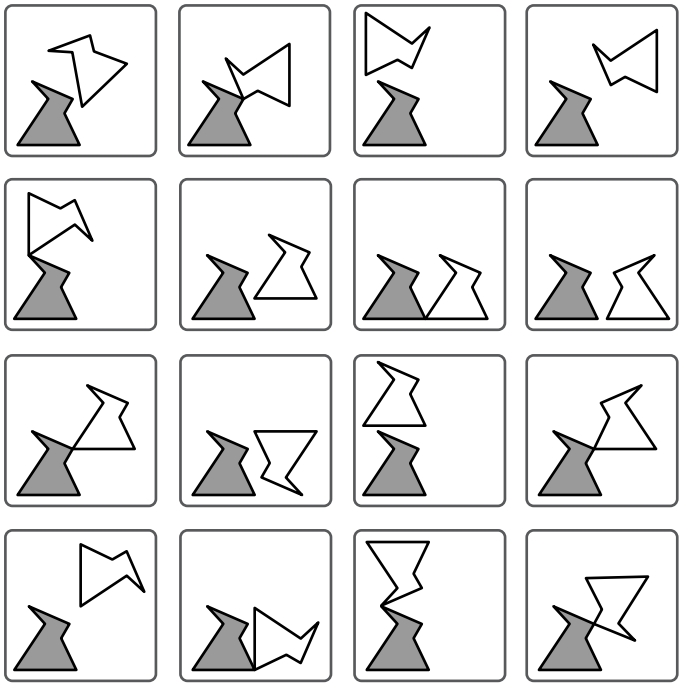
Round 2



Round 3



Round 4



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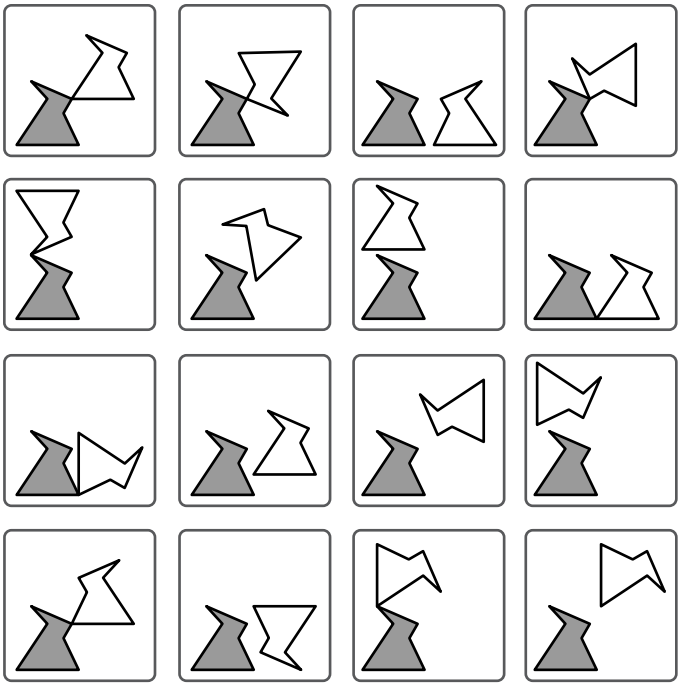
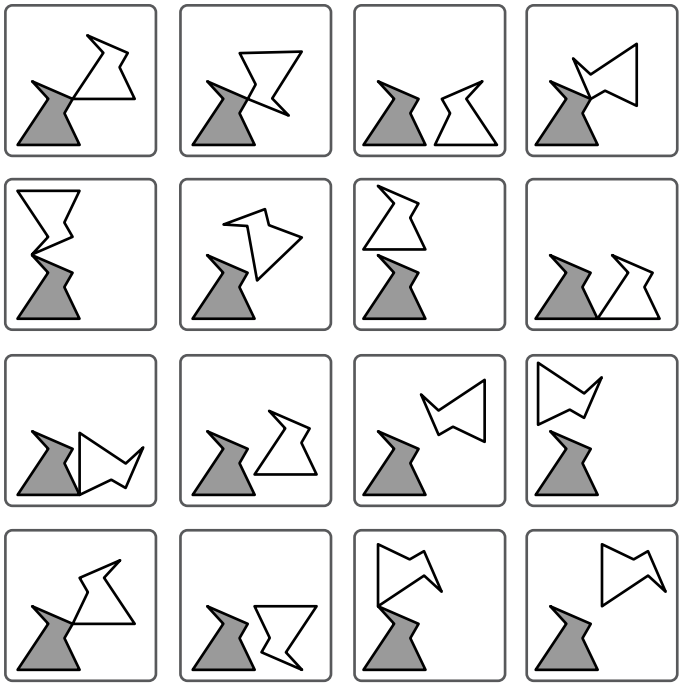
Polygraph Set B

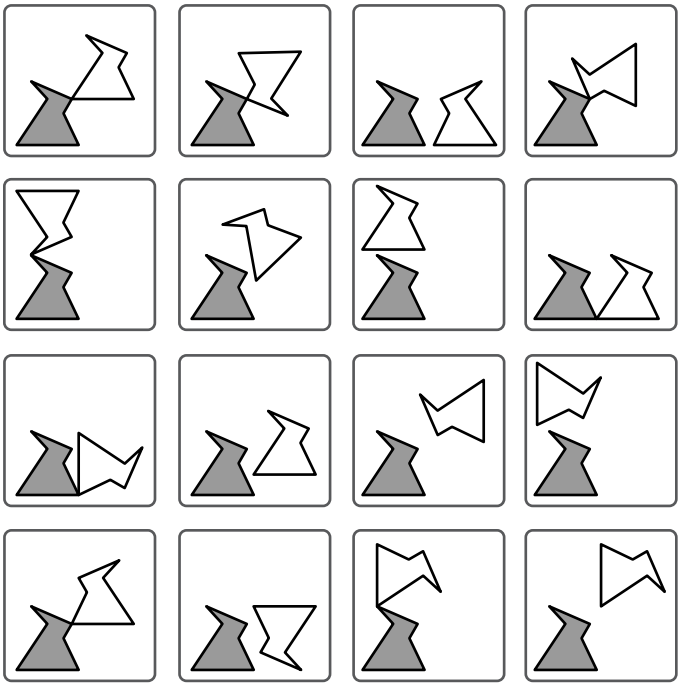
Round 1



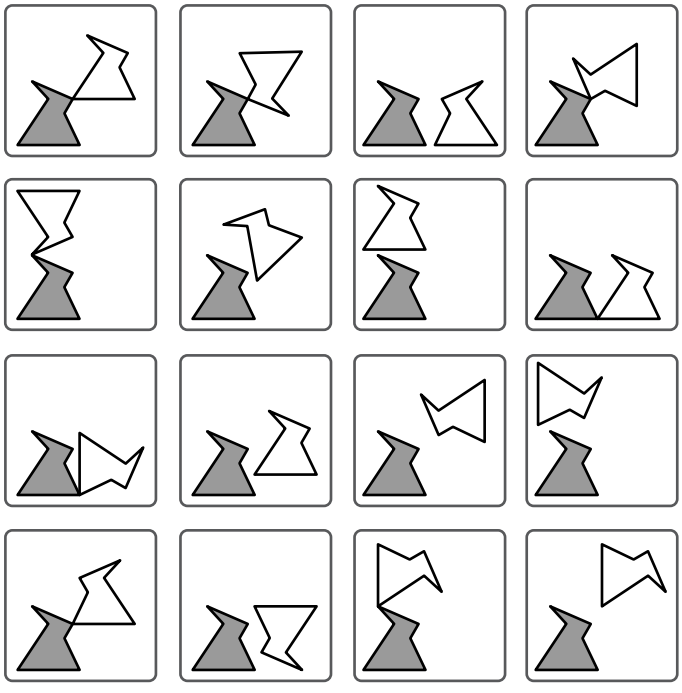
Round 2



Round 3



Round 4



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Transformation Information

Directions: Make one copy per pair of students. Then pre-cut the cards and give each pair one set.

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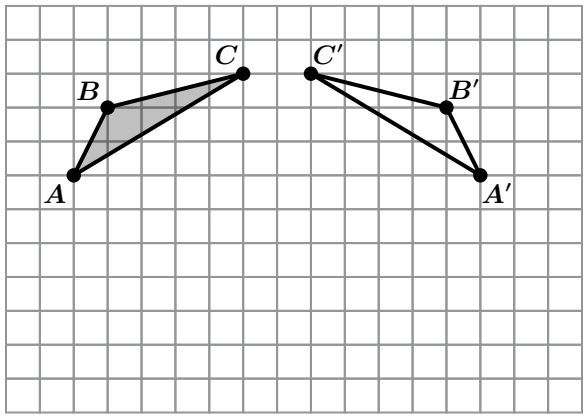
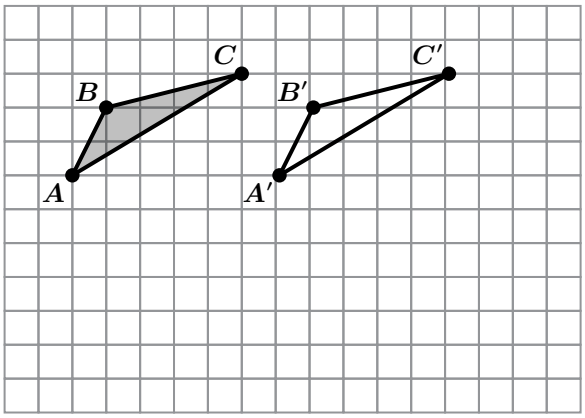
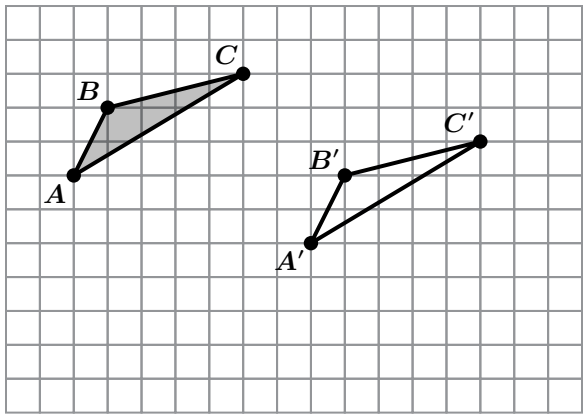
Card 1



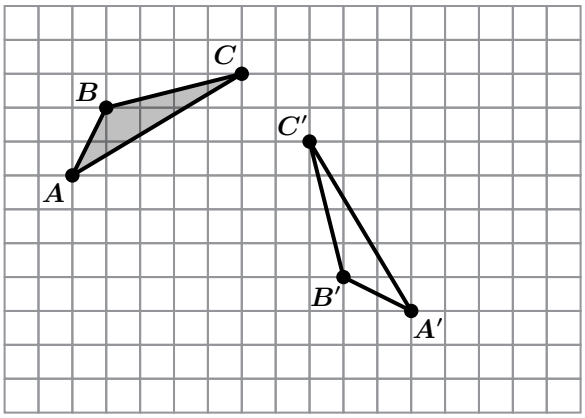
Card 2



Card 3



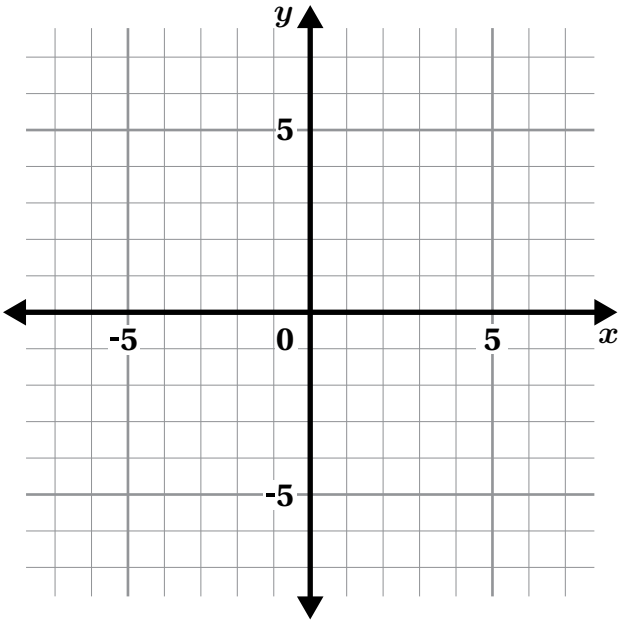
Card 4



Challenge Creator

- On the graph, plot four points and connect them to make your own figure. Your figure will be the pre-image.
- Label each point with its coordinate pair (x, y).
- Choose and define a transformation.
  - For a translation, include the number of units and the direction.
  - For a rotation, include the direction and degrees.
  - For a reflection, include whether it is over the x- or y-axis.
- Don't show the image or write its coordinates on this sheet. You and your classmates will determine the image coordinates of each other's transformations on the lesson sheet.

My Pre-Image Polygon:



My Transformation:

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Card Sort: Rigid Transformations

Directions: Make one copy per pair of students. Then pre-cut the cards and give each pair of students one set.

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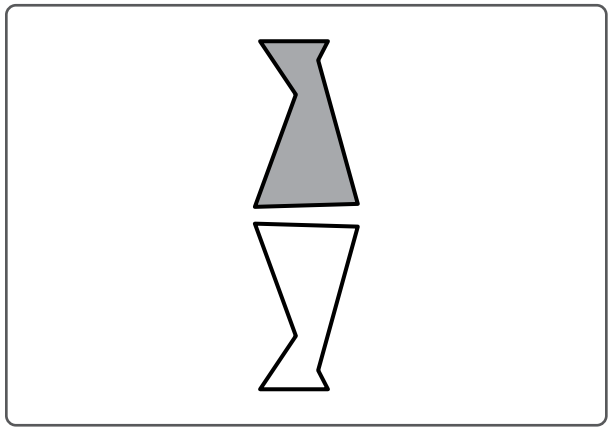
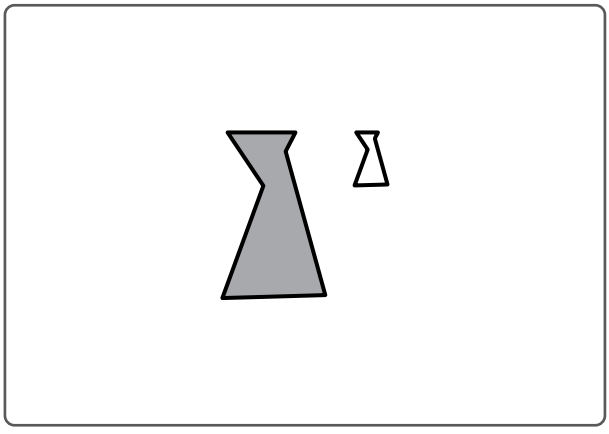
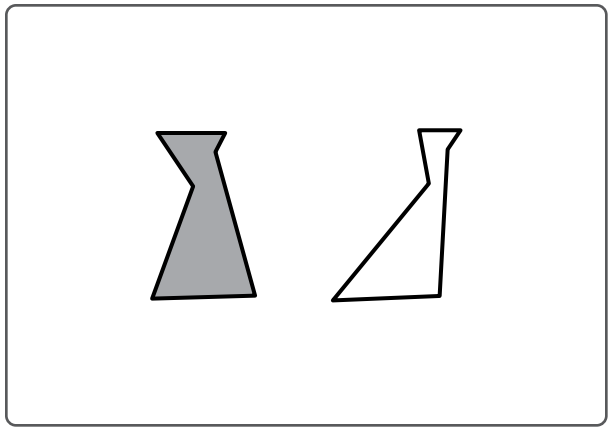
Card A



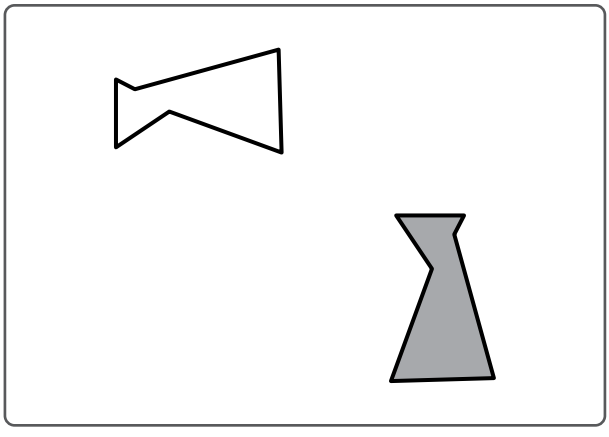
Card B



Card C



Card D



Card Sort: Rigid Transformations

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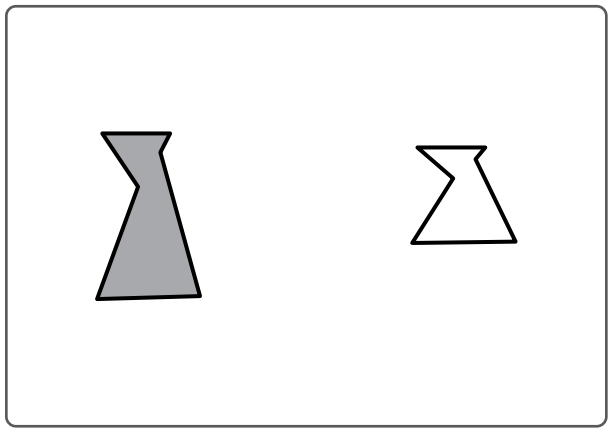
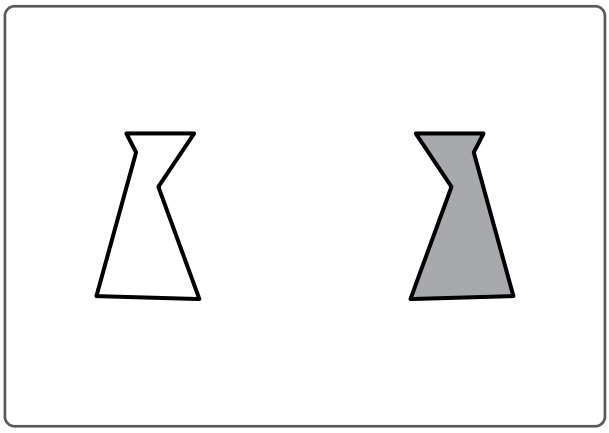
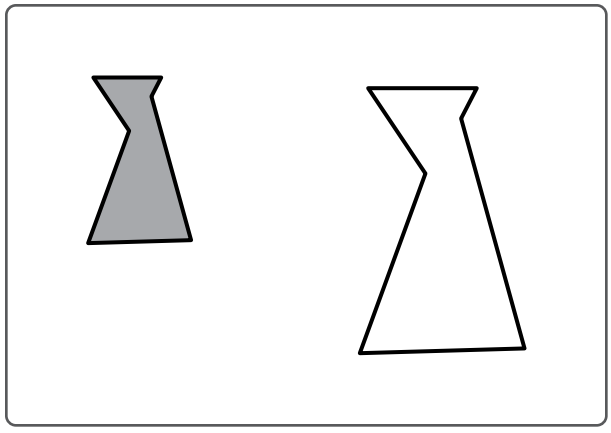
Card E



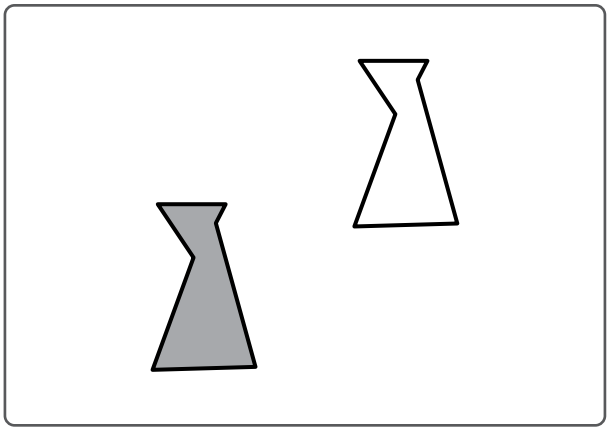
Card F



Card G



Card H



Find All Three

Directions: Make one copy for every 36 students. Then pre-cut the cards and give each student one card.

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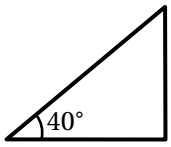
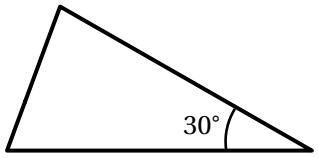
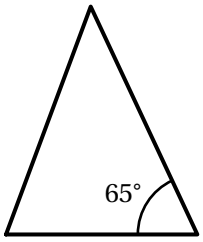
Card 1



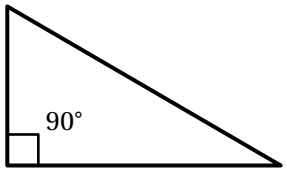
Card 2



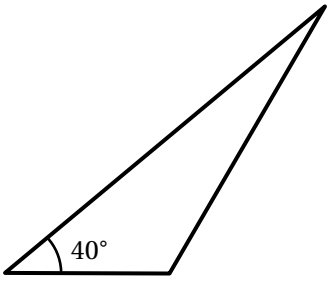
Card 3



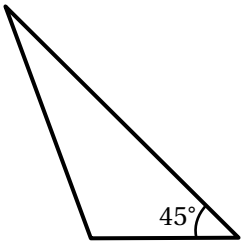
Card 4



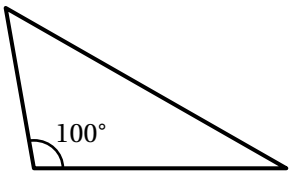
Card 5



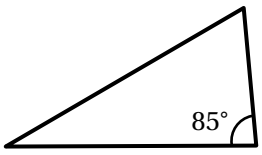
Card 6



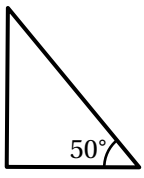
Card 7



Card 8



Card 9



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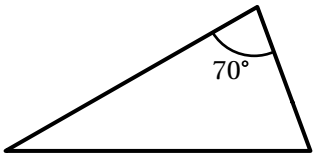
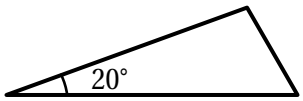
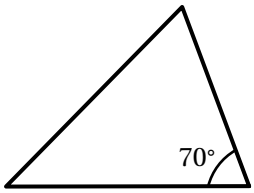
Card 10



Card 11



Card 12



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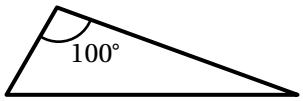
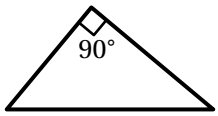
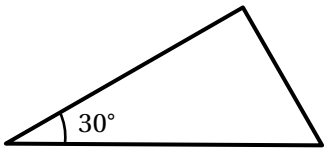


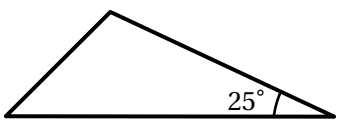
Card 14



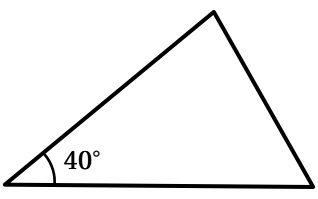
Card 15



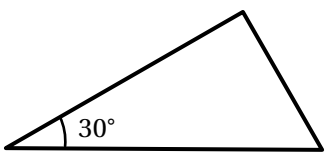
Card 16



Card 17



Card 18



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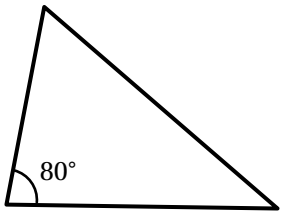
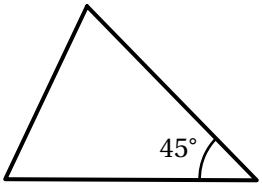
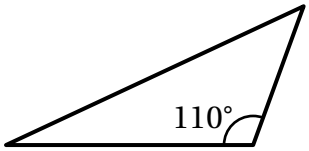
Card 19



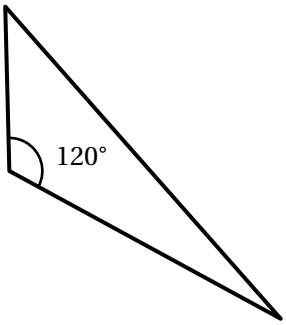
Card 20



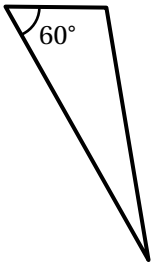
Card 21



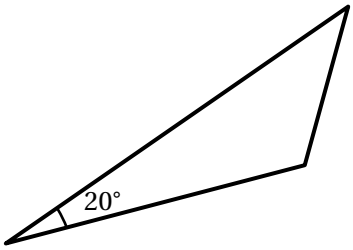
Card 22



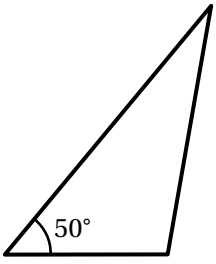
Card 23



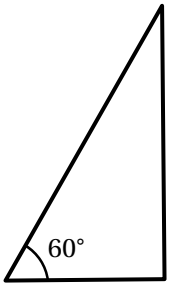
Card 24



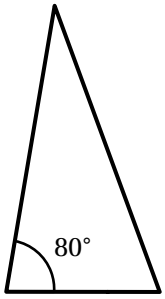
Card 25



Card 26



Card 27



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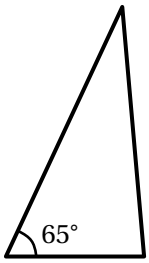
Card 28



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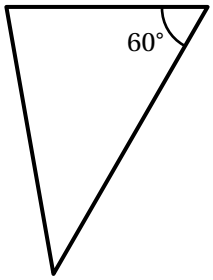

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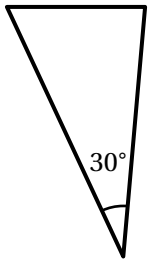

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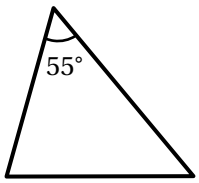

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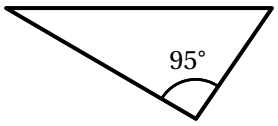

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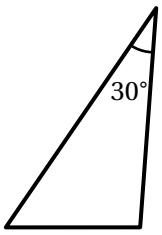

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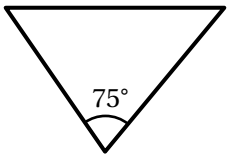

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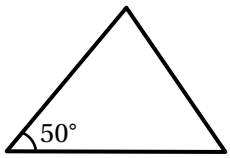

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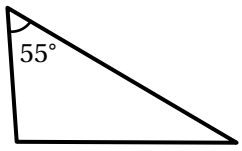

Tear It Up Again

Here are 3 copies of the same triangle. Two of the triangles have one side extended to create an exterior angle.

Directions:

- Cut out the bottom copy of the triangle.
- Tear the three angles off of the triangle like you did in the previous activity.
- See if you can find a combination of angles that cover the exterior angle on the top triangle.
- Now, see if you can find a combination for the bottom triangle.

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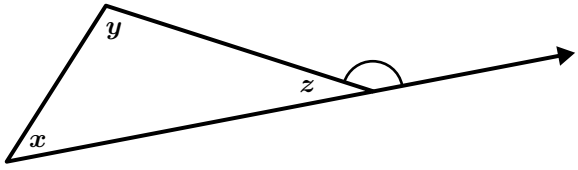
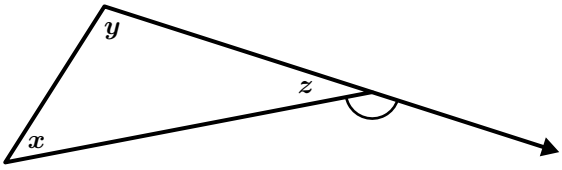
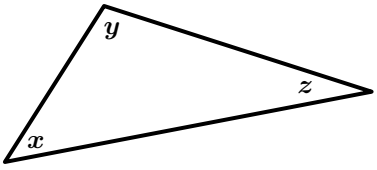


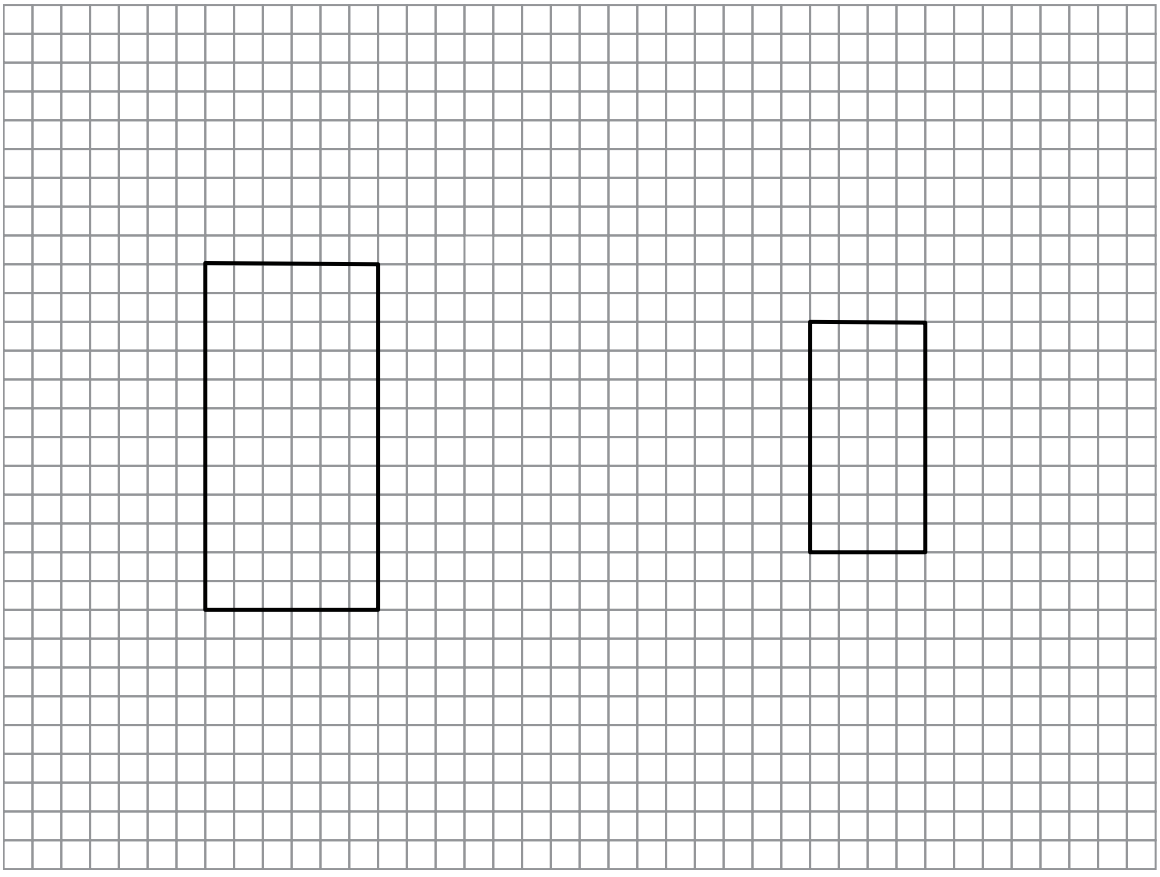




Unit 2
Activity Sheets and Cards

You're invited to explore more.

Design your own robot on the left. Then complete its scaled copy on the right.



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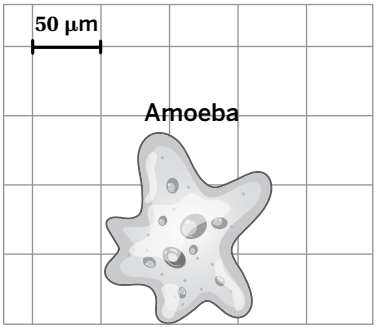
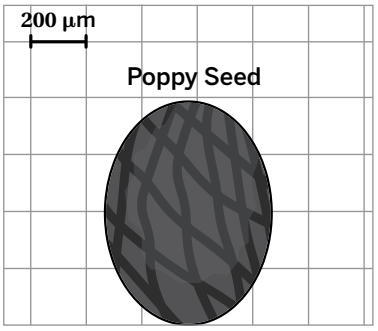
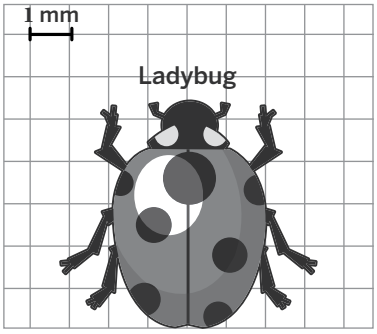
Scale

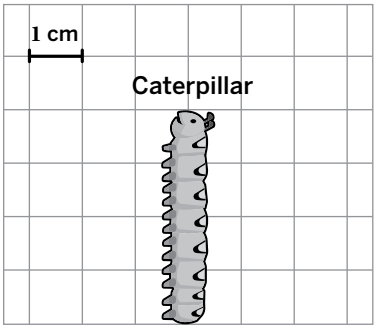
Estimate the actual height of each object.

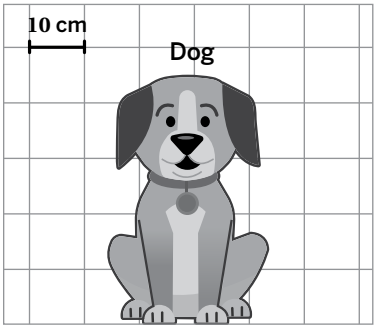
Note: μm means micrometer, which is one millionth of a meter.

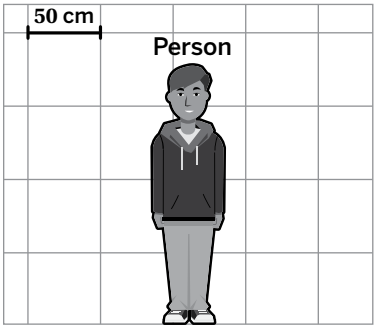


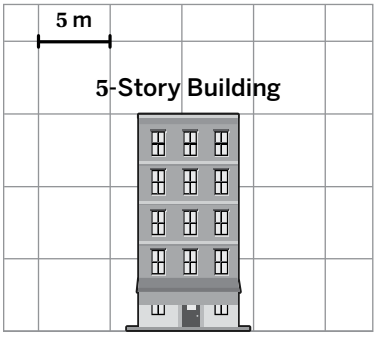


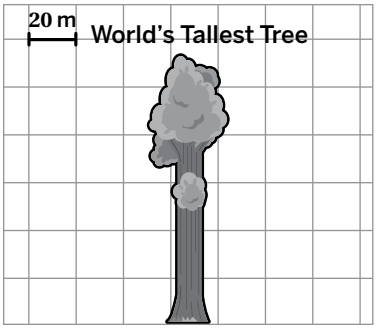


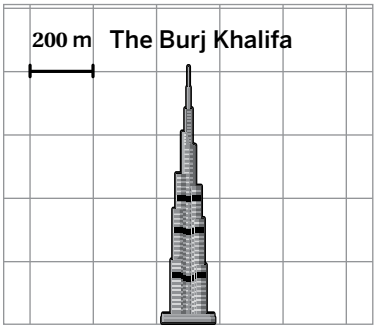












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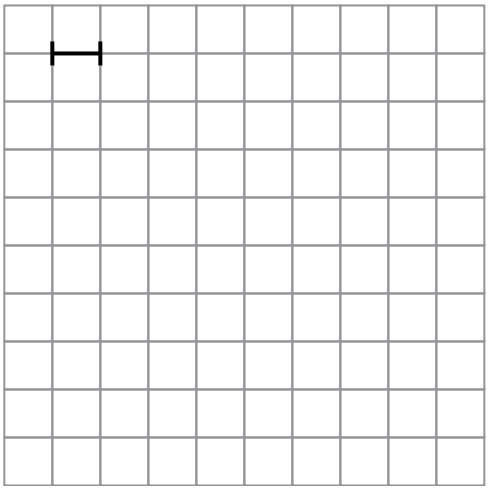
Explore More

a Select a scale.

- **A.** 1 unit to 1 cm
- **B.** 1 unit to 1 m
- **C.** 1 unit to 1 km

b List several objects that could be drawn on this grid using this scale.

c Create a scale drawing of one of those objects using the scale you selected.



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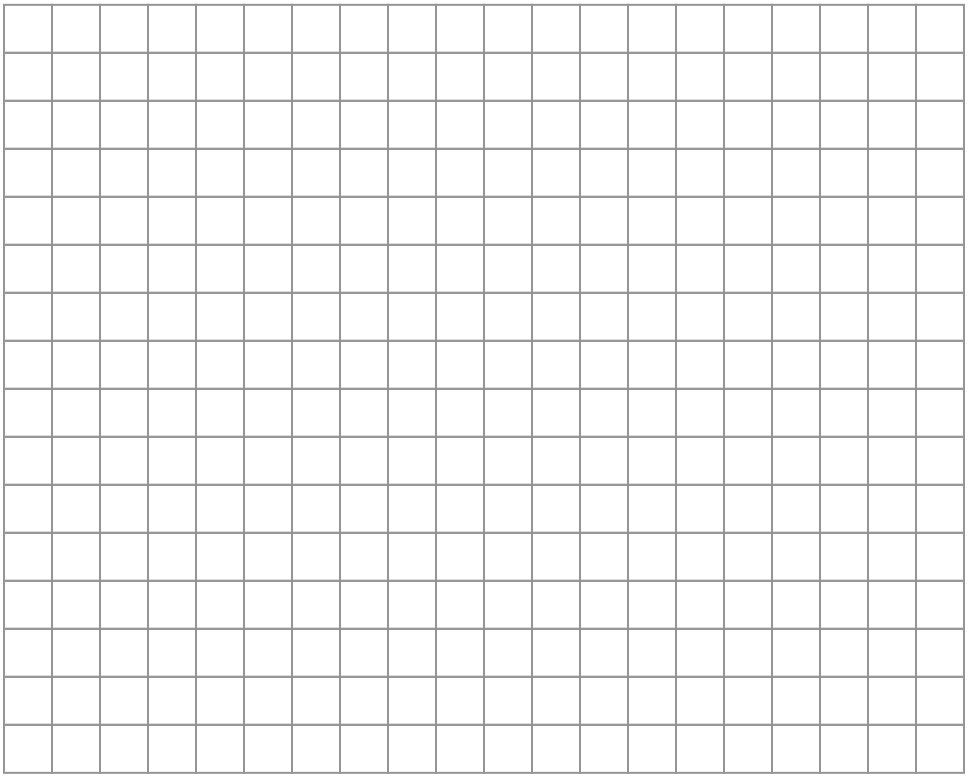
Challenge Creator

Create your own dilation challenge by completing these steps:

- Draw a triangle and label the vertices A, B, and C.
- Choose a center of dilation and label it D.
- Choose a scale factor: _____



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Card Sort: Scavenger Hunt

Directions: Make one copy per class. Then pre-cut the cards and give each student one card.

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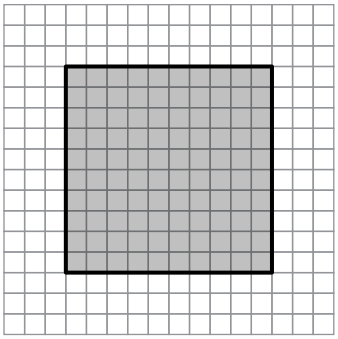
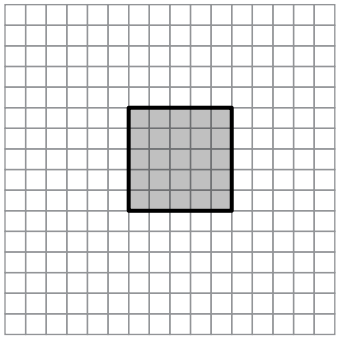
Card 1



Card 2



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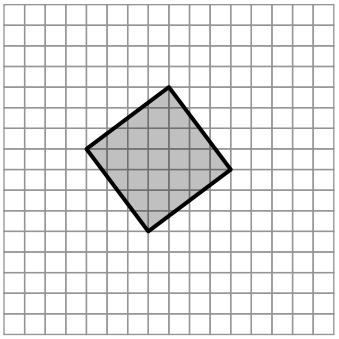

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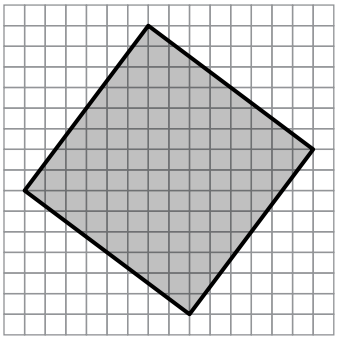

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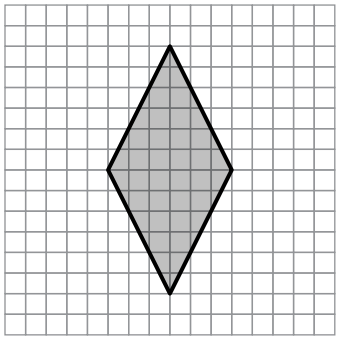

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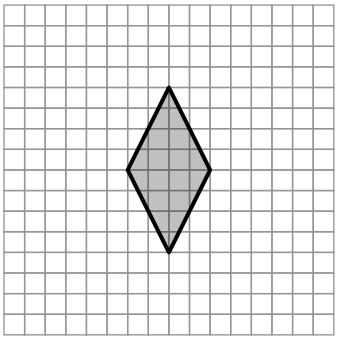

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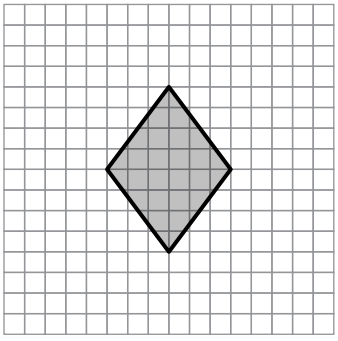

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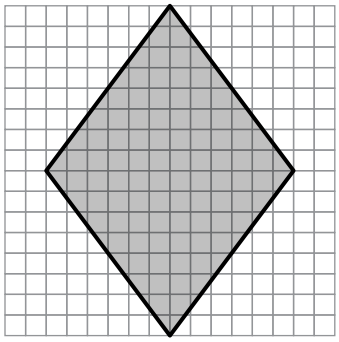

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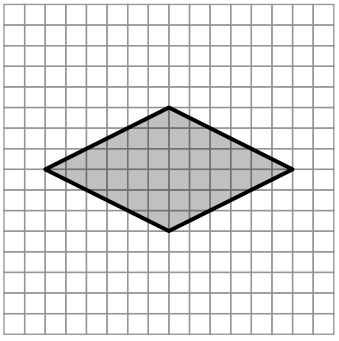

Card Sort: Scavenger Hunt

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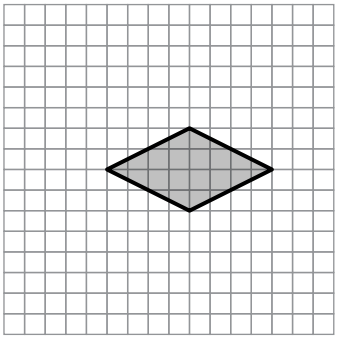
Card 10



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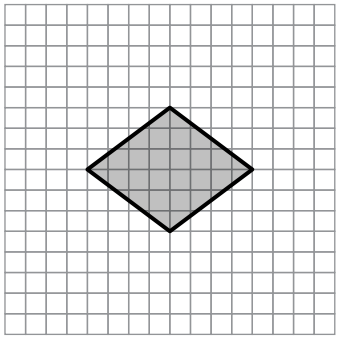

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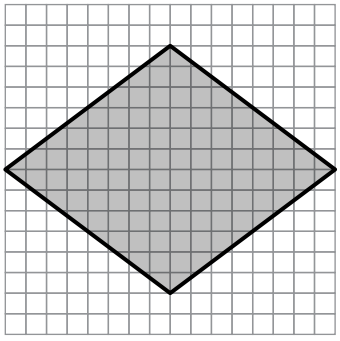

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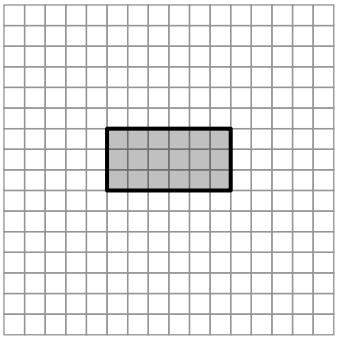

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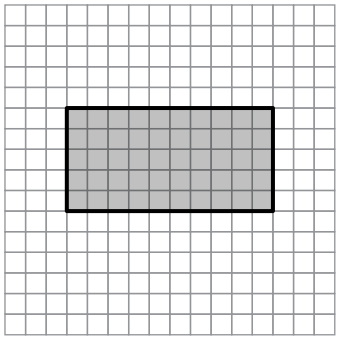

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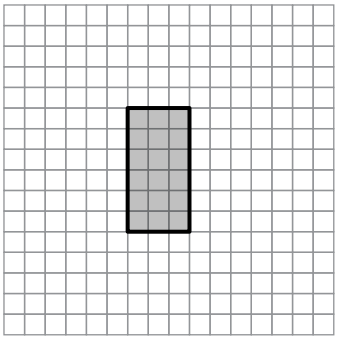

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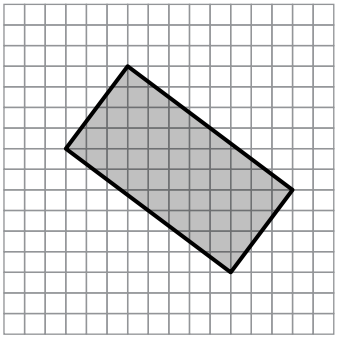

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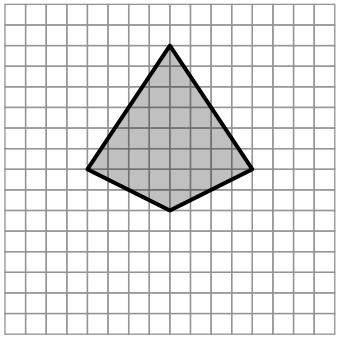

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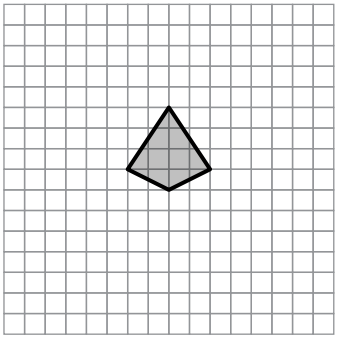

Card Sort: Scavenger Hunt

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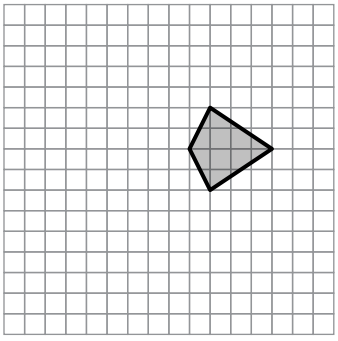

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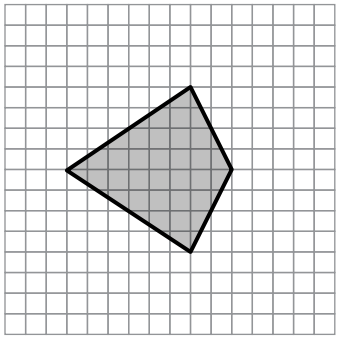

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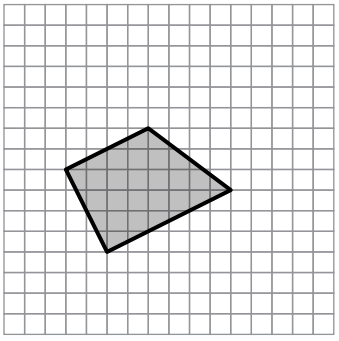

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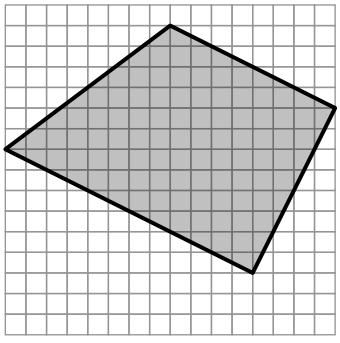

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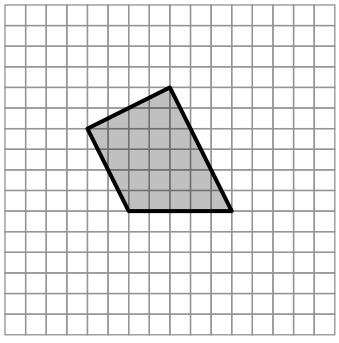

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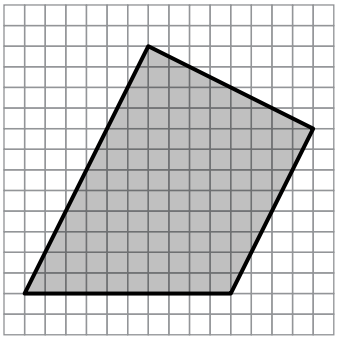

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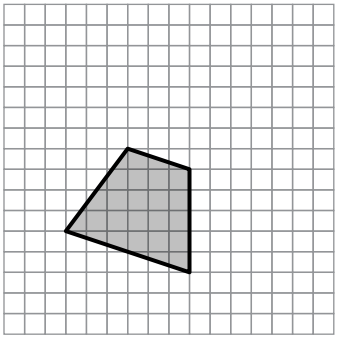

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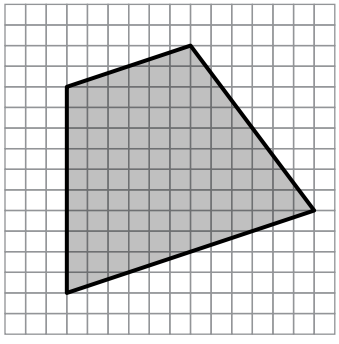

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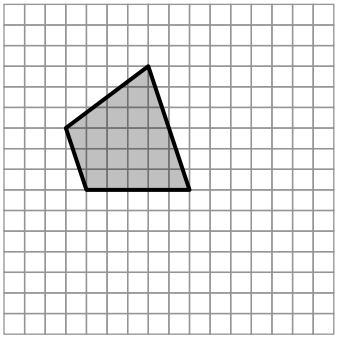

Card Sort: Scavenger Hunt

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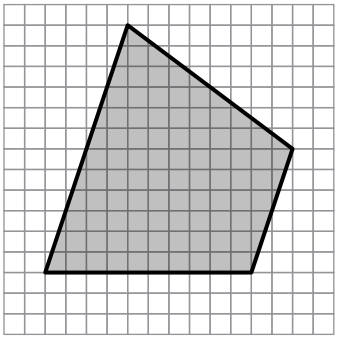
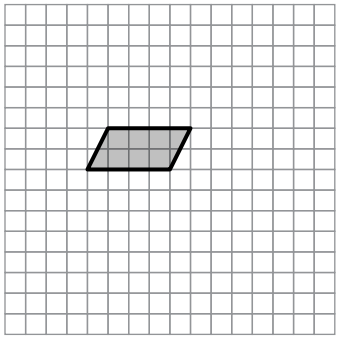
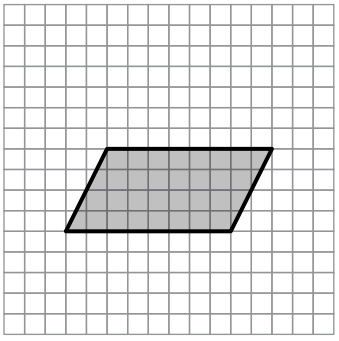
Card 28



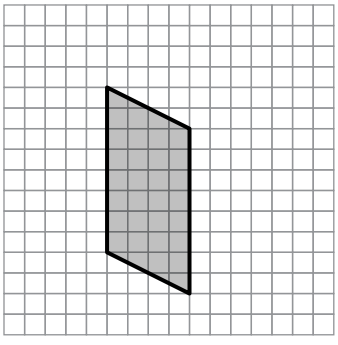
Card 29



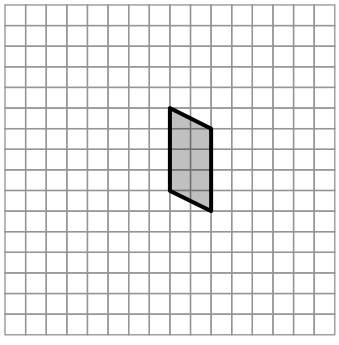
Card 30



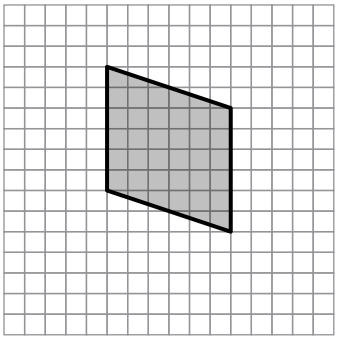
Card 31



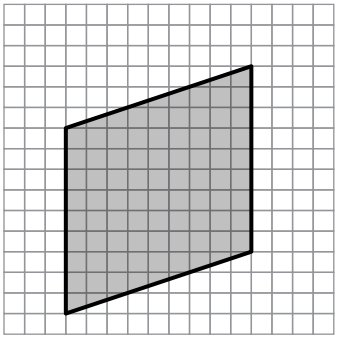
Card 32



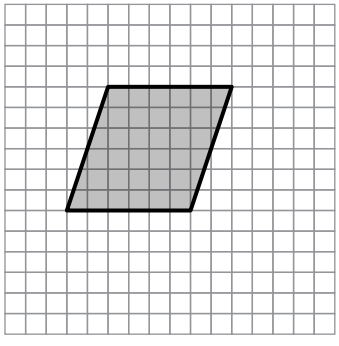
Card 33



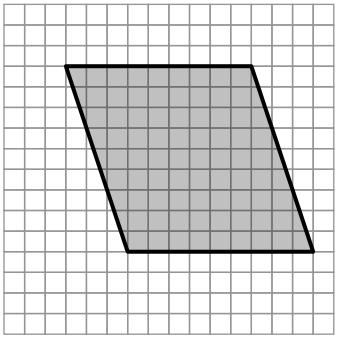
Card 34



Card 35



Card 36



Card Sort: Scavenger Hunt

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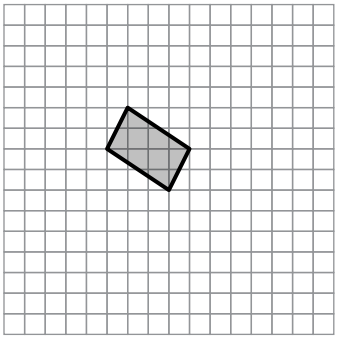
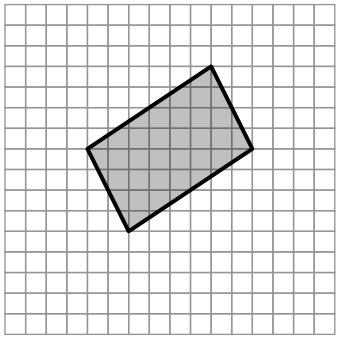
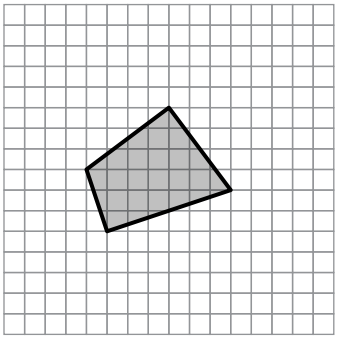
Card 37



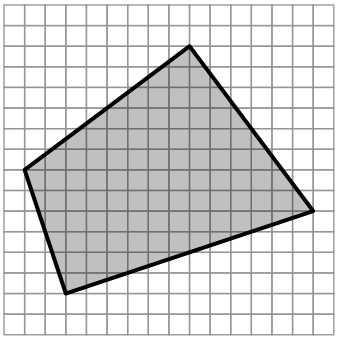
Card 38



Card 39



Card 40



Straight Water Slide

Directions: Carefully cut out each of the triangles so that you can still see the border lines. These triangles represent the slide components you may choose from to create your own slides.

- Align at least three triangles by matching up the hypotenuse endpoints.
- The legs of the triangles must remain horizontal and vertical.

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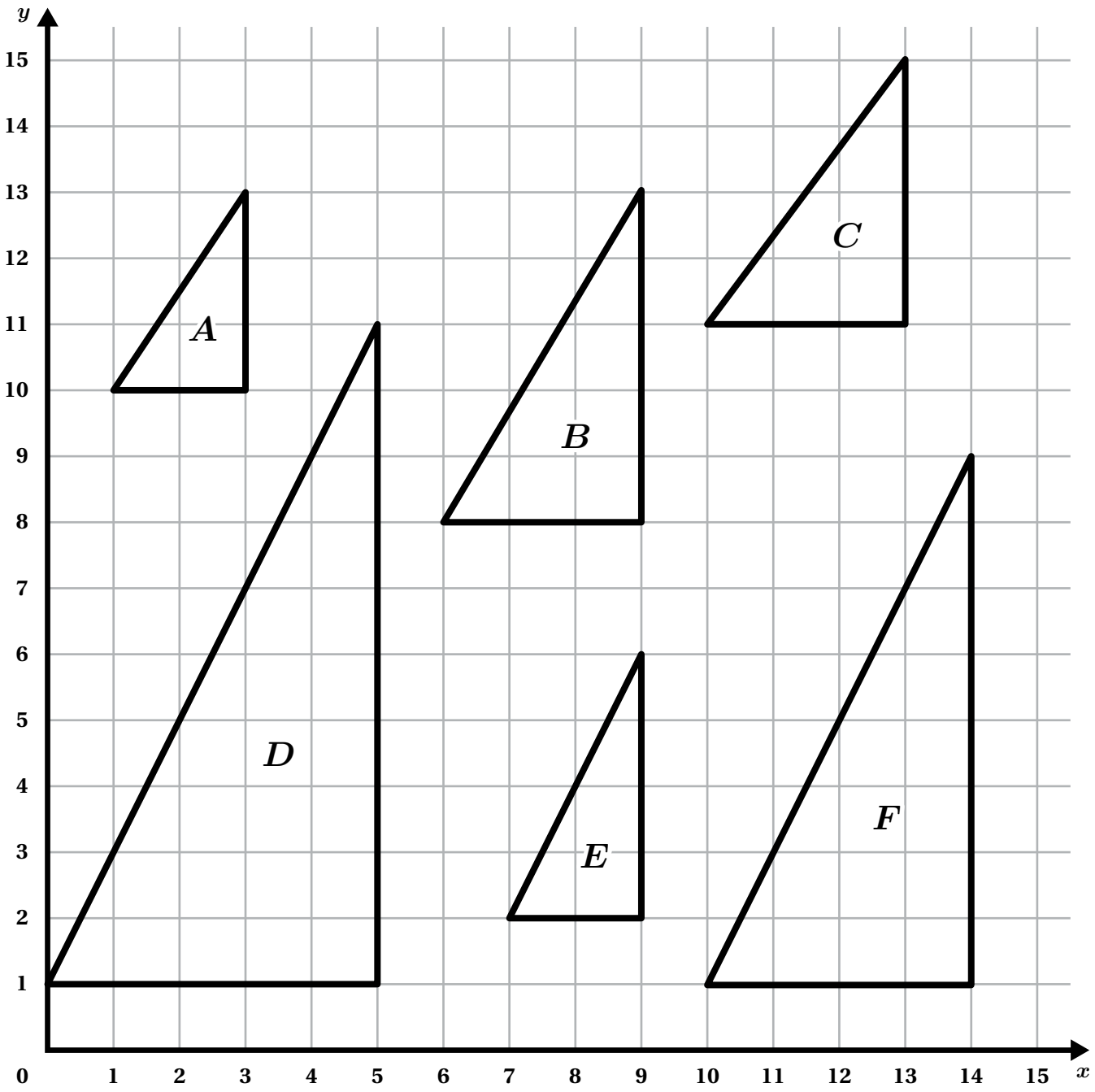

Unit 3
Activity Sheets and Cards

You're invited to explore more.

Here are some facts about this truck:

- It travels at an average rate of 50 miles per hour.
- It can travel 6 miles for each gallon of gas.

How many hours can the truck travel without stopping if it has a full tank of 150 gallons?

Explain your thinking.

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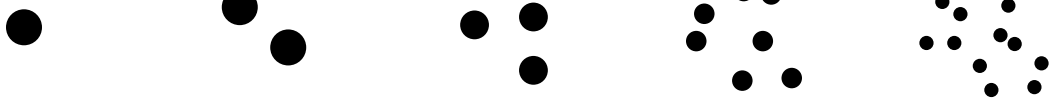
You're invited to explore more.

Observe how the number of circles changes at each stage.

Stage 0 Stage 1 Stage 2 Stage 3 Stage 4



a Complete the table.

Stage	Number of Circles
0	*1*
1	
2	
3	
4	

b Does this represent a proportional relationship? Circle one.

Yes No

Explain your thinking.

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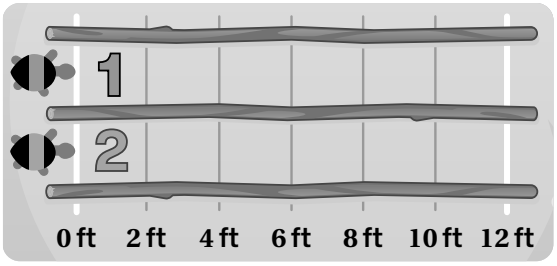
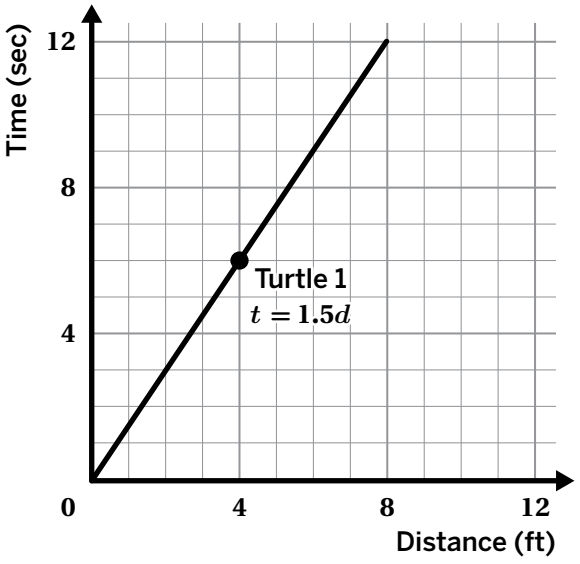
You're invited to explore more.

The graph shows the line for Turtle 1.

Draw a line for Turtle 2 so that it's slower than Turtle 1. Notice the axis labels!





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Unit 4
Activity Sheets and Cards

Matchmaker

Directions: Make one copy per pair of students. Then pre-cut the cards and give each pair one set.

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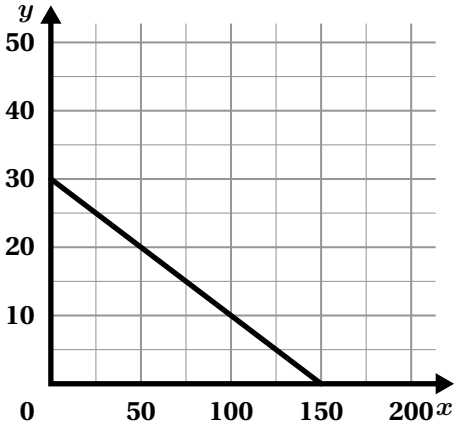
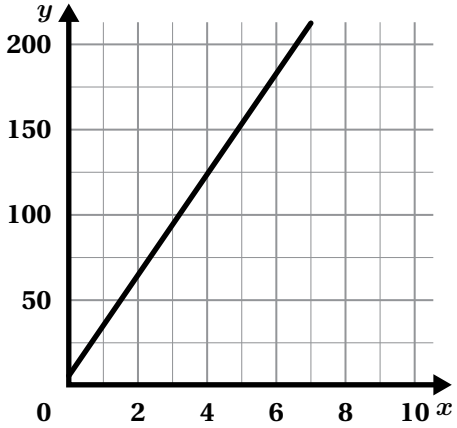
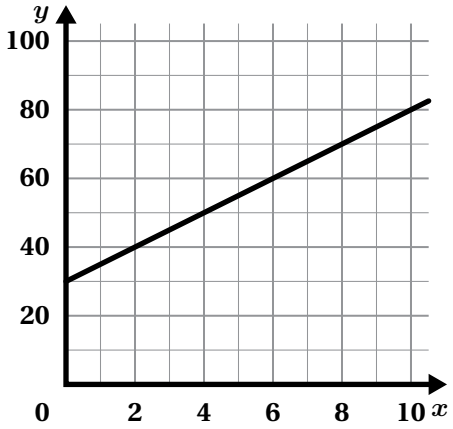
Graph A



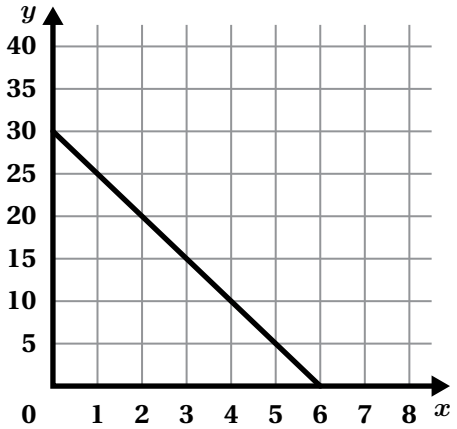
Graph B



Graph C

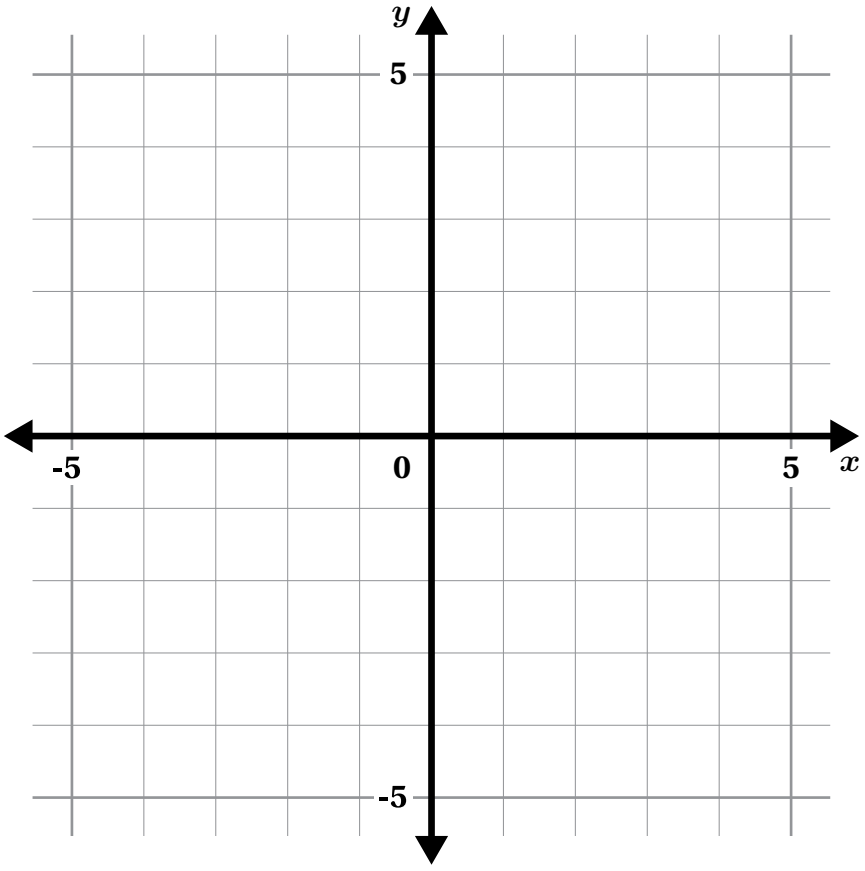


Graph D



Challenge Creator

Draw 8 coins on the graph.



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Unit 5
Activity Sheets and Cards

Similar Problems

Here are three sets of related situations.

	Situation A	Situation B
Set 1	6 members of the Martinez family are going to their school's Community Day. They have a coupon for $4.50 off each ticket. If they pay $40.50 for all their tickets, how much does one ticket cost without the coupon?	6 members of the Benton family are going to their school's Community Day. They have a coupon for $4.50 off their total. If they pay $40.50 for all their tickets, how much does one ticket cost without the coupon?
Set 2	Kwabena and Trevon are working together tossing bean bags to one side of a scale in order to balance a giant 15-pound stuffed animal. They're successful after Kwabena tosses 13 bean bags and Trevon tosses 8 bean bags onto the scale. How much does each bean bag weigh?	Adah and Ivan are working together tossing bean bags to one side of a scale in order to balance a giant 15-pound stuffed animal. They're successful after Adah tosses 13 small bean bags and Ivan tosses one giant 8-pound bean bag onto the scale. How much does each small bean bag weigh?
Set 3	Marquis and Yolanda plan to sell T-shirts at their school's Community Day. They make 25 shirts and each costs $15 to make. If they would like to make $320 in profit, how much should they sell each T-shirt for?	Melissa and Cameron plan to sell T-shirts at their school's Community Day. They spend $25 on supplies and make 15 shirts. If they would like to make $320 in profit, how much should they sell each T-shirt for?

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Equation Roundtable

Directions: Make one copy per group. Then pre-cut the cards and give each group one set.

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Card 1

$$-4x - 7 - 2x = 4x - 2$$

Card 2

$$\frac{1}{2}(7x - 6) = 6x - 8$$

Equation Roundtable

Directions: Make one copy per group. Then pre-cut the cards and give each group one set.

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Card 3

$$\frac{3}{4}x + 7 = x + 13$$

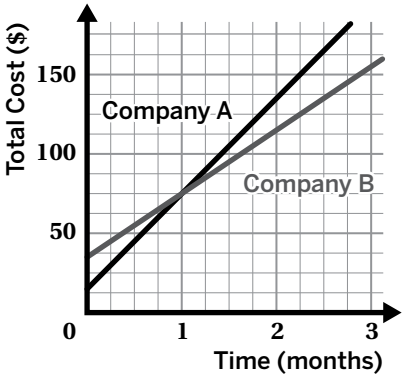
Card 4

$$-4x + 14 = 2(x + 7)$$

Challenge Creator

- Select *one* situation to focus on.
- Fill in the statement to describe a single point anywhere on the graph.

Phone Plans

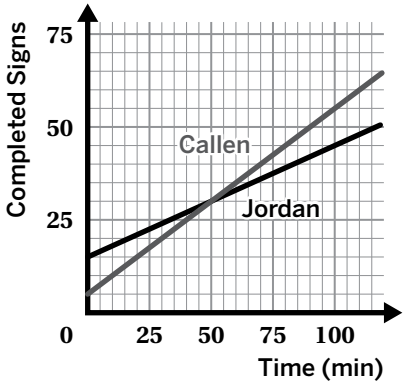


You are shopping for a new cell phone and a plan with unlimited data.

- Company A has a $15 setup fee, and then charges $60 per month.
- Company B has a $35 setup fee, and then charges $40 per month.

Statement: At _____ months, the cost of my phone plan is _____.

Signs

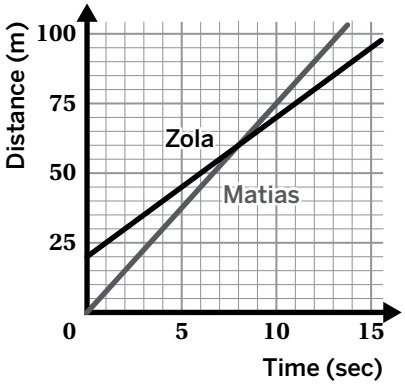


Callen and Jordan are making locker signs to decorate for spirit week. The coordinate plane shows each person's progress today.

- Callen made 5 signs yesterday and is making a new sign every 2 minutes today.
- Jordan made 15 signs yesterday and is making a new sign every 4 minutes today.

Statement: At _____ minutes, _____ signs were made.

Race

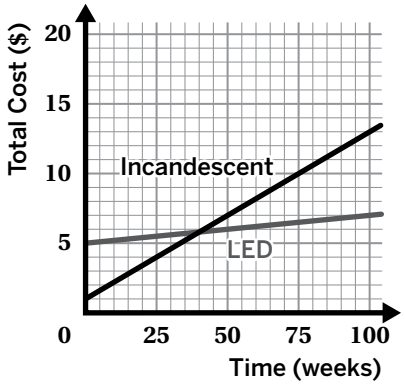


Zola and Matias raced 100 meters. Both racers started at the same time and ran at a constant speed.

- Zola had a 20-meter head start and ran 5 meters per second.
- Matias ran 7.5 meters per second.

Statement: At _____ seconds, the distance is _____ meters.

Light Bulbs



Traditional incandescent bulbs are cheaper to purchase, but they use more energy compared to LED bulbs.

- Traditional incandescent bulbs cost about $1 each, and 12 cents per week to use.
- LED bulbs cost about $5 each, and 2 cents per week to use.

Statement: At _____ weeks, the total cost of the light bulbs is _____.

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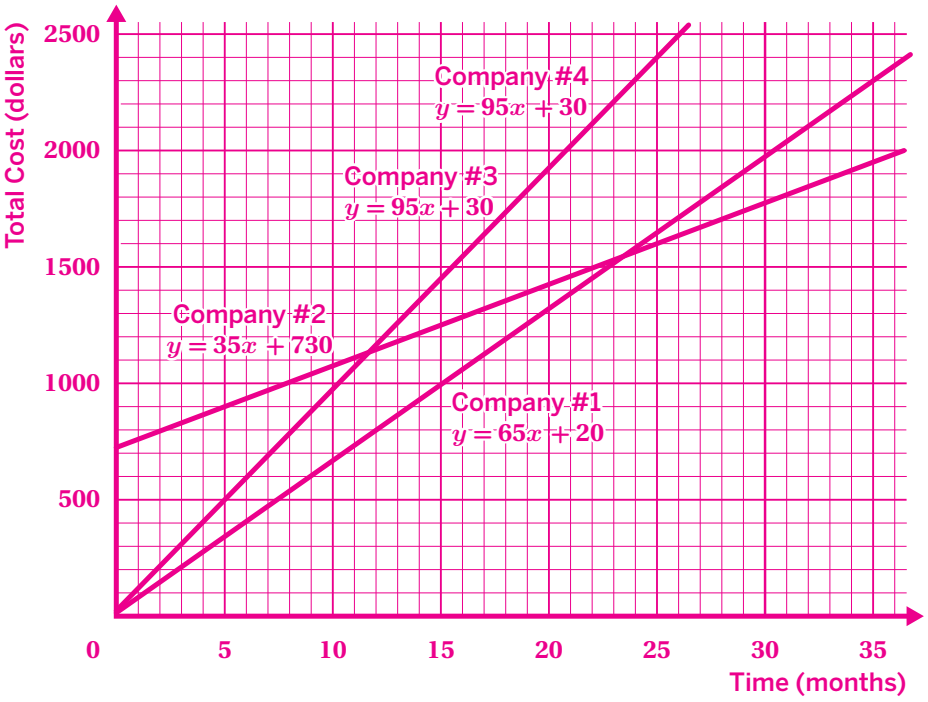
On Both Lines (answers)



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Unit 6
Activity Sheets and Cards

Matching

Directions: Make one copy for each group of students. Then pre-cut the cards and give each group one set.

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A

x	y
1	4
3	4
5	4
7	4

B

x	y
1	3
2	6
4	9
8	12

C

x	y
0	7
1	3
1	7
3	10

D

$3y = x$

E

$y = 2x - 8$

F

$y = x(x + 6)$

G

$x = 5$

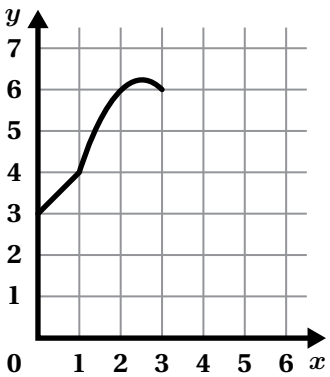
H

$2y + 3x = 10$

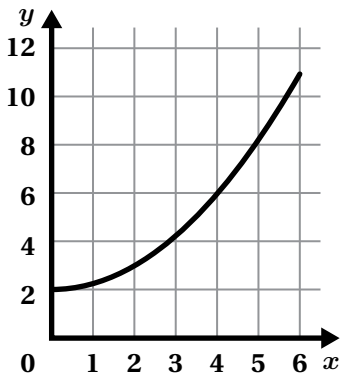
I

$y = 9x^3$

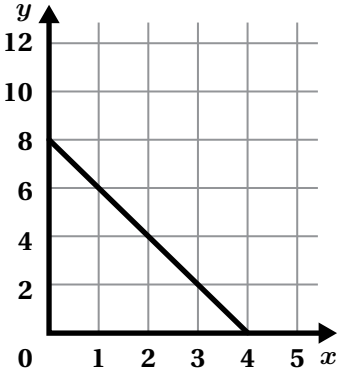
J



K



L



Unit 7
Activity Sheets and Cards

Circle Centers

Directions: Make one copy per pair of students. Then pre-cut the circles and give each pair of students one set.

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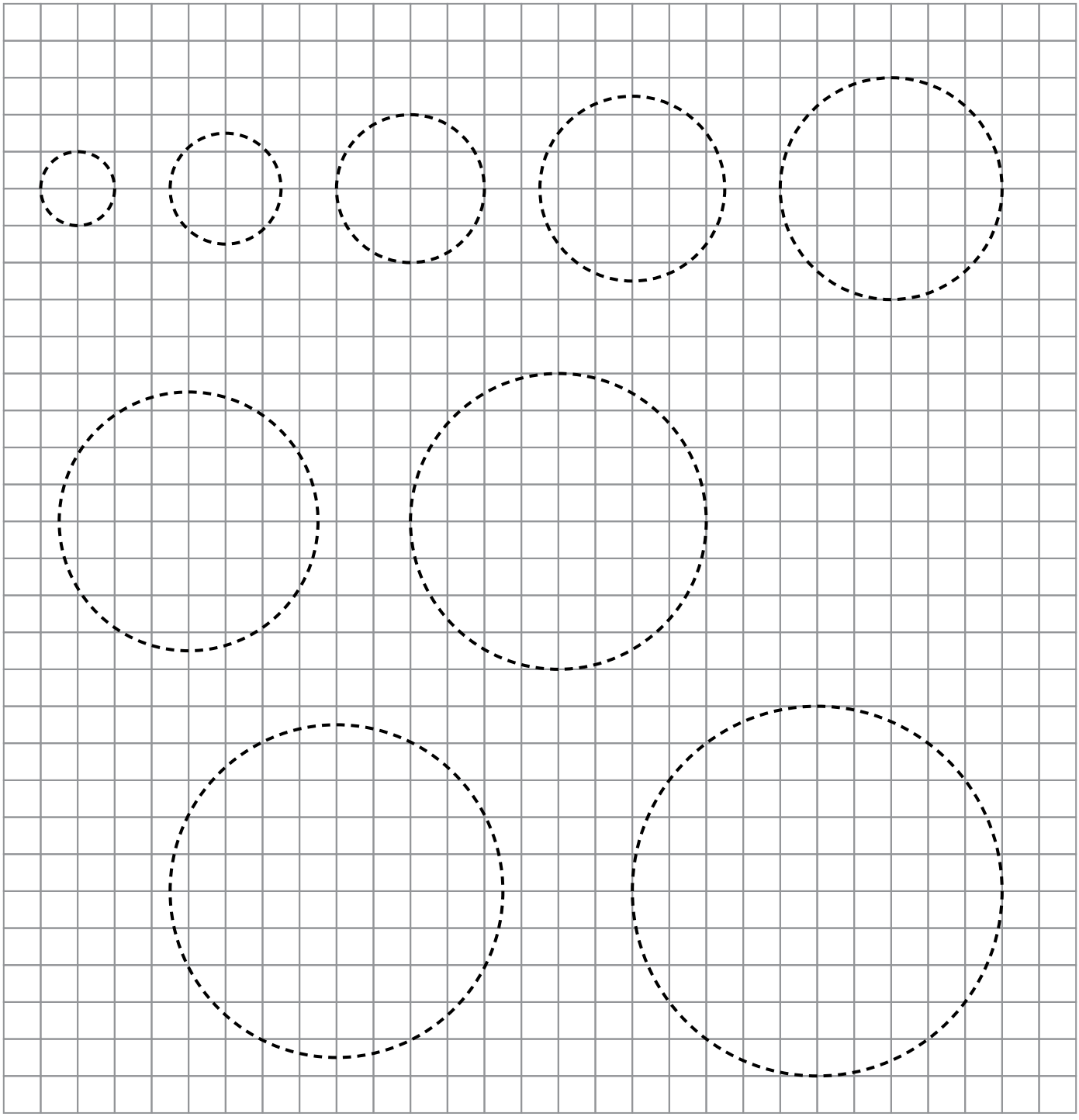

Squares Cover Circle

Directions: Make one copy per group of students. Then pre-cut the cards and give each group of students one set.

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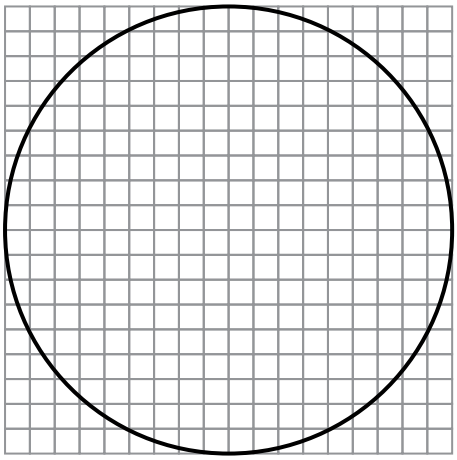
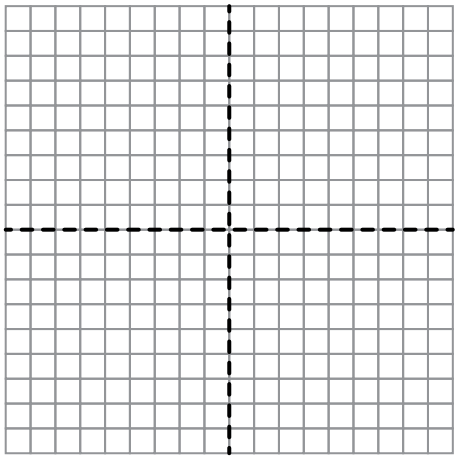
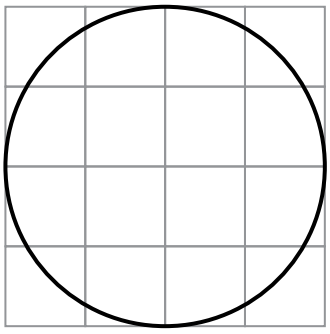
Circle A



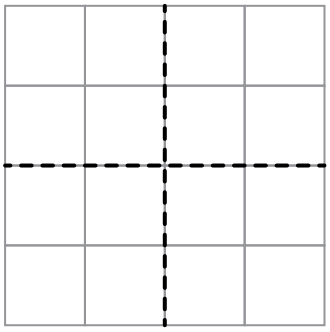
Radius Squares for Circle A



Circle B



Radius Squares for Circle B



Squares Cover Circle

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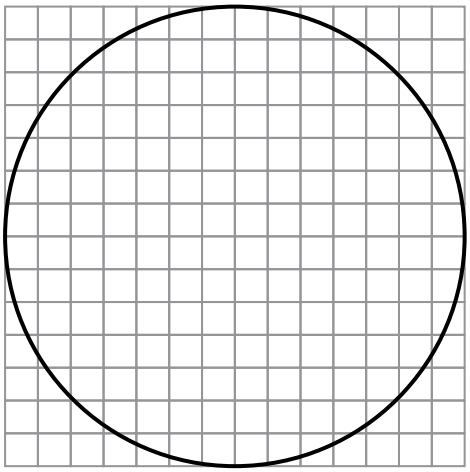
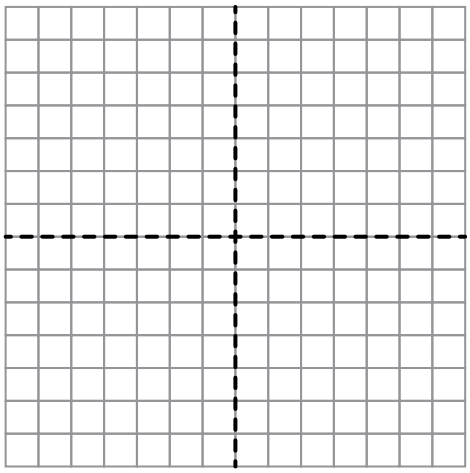
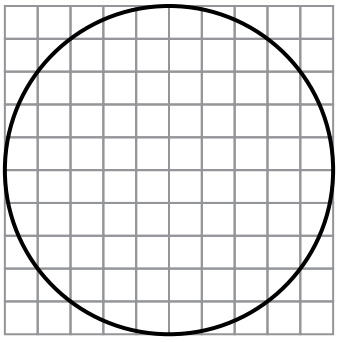
Circle C



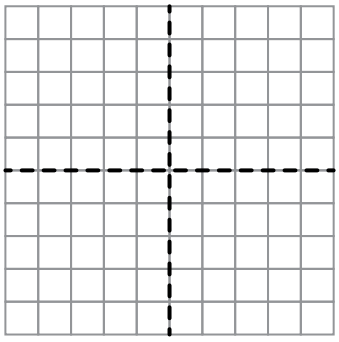
Radius Squares for Circle C



Circle D



Radius Squares for Circle D



Piecing It Together

Directions: Perform these steps to form a rectangle from a circle.

Step 1: Highlight the circumference with a highlighter.

Step 2: Cut out the circle.

Step 3: Fold the circle in half 4 times to form 16 equal-sized wedges.

Step 4: Cut out the 16 wedges.

Step 5: Use the wedges to form a rectangle. Place down the first wedge pointing up, then alternate wedges pointing down and up until all are used.

Step 6: Tape the wedges together so they stay in place.

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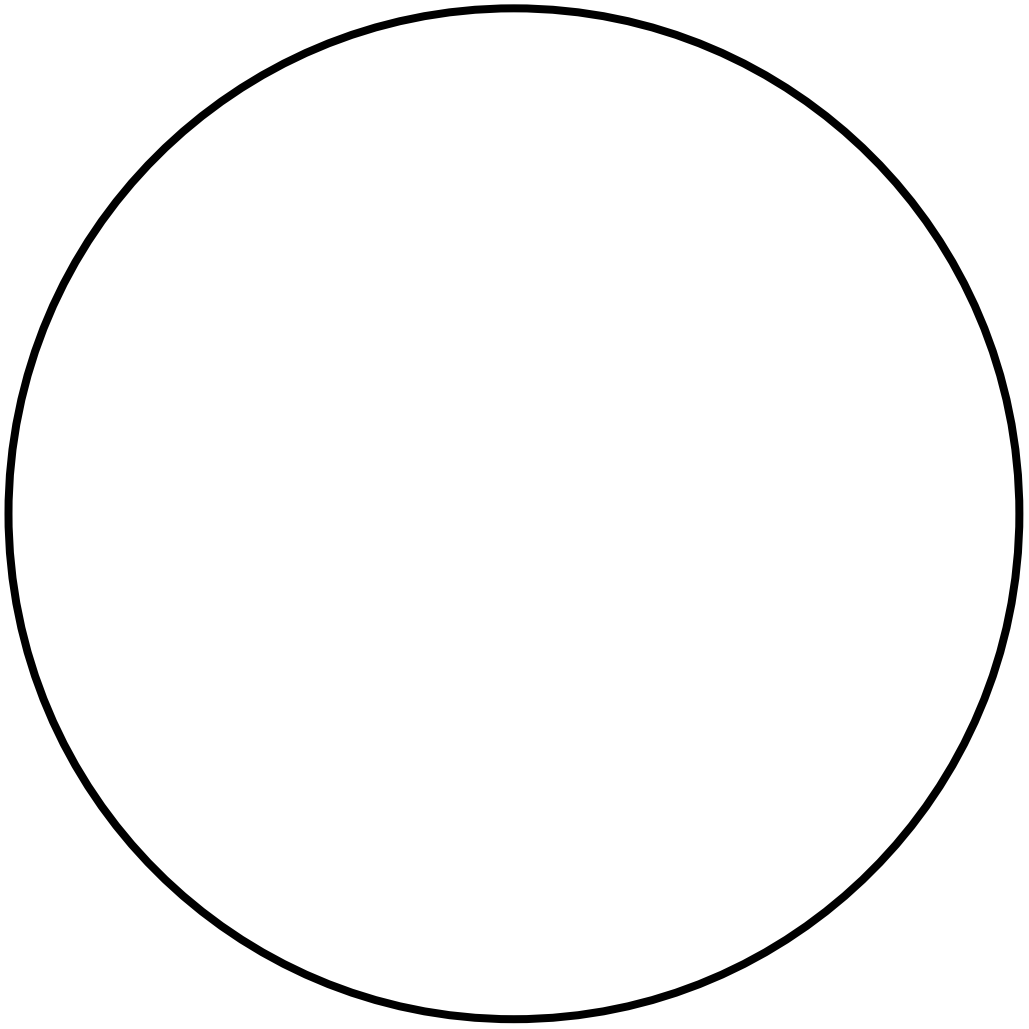

Card Sort: Greatest Total Area

Directions: Make one copy per pair of students. Then pre-cut the cards and give each pair of students one set.

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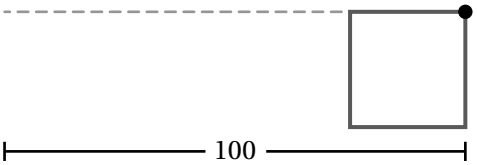
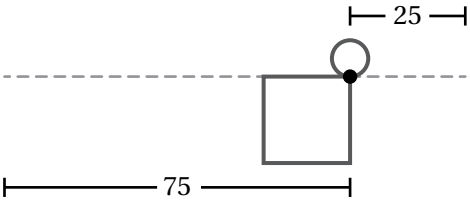
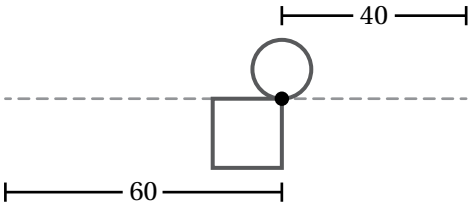
Card 1



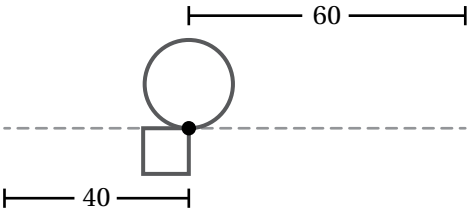
Card 2



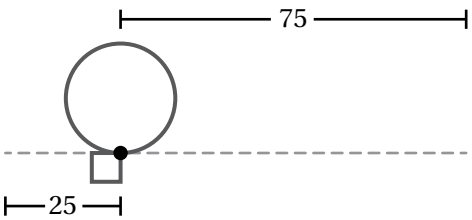
Card 3



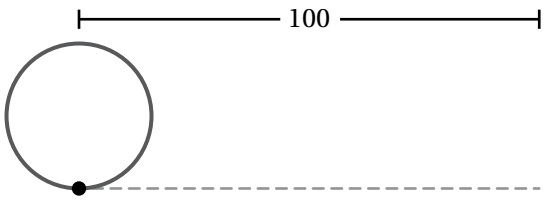
Card 4



Card 5



Card 6



Unit 8
Activity Sheets and Cards

Challenge Creator

Directions: Make one copy for each group of students. Then pre-cut the cards and give each group one set.

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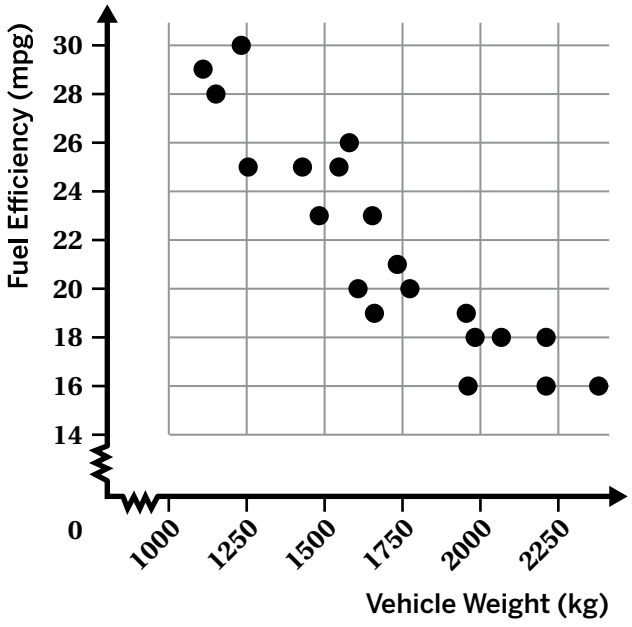
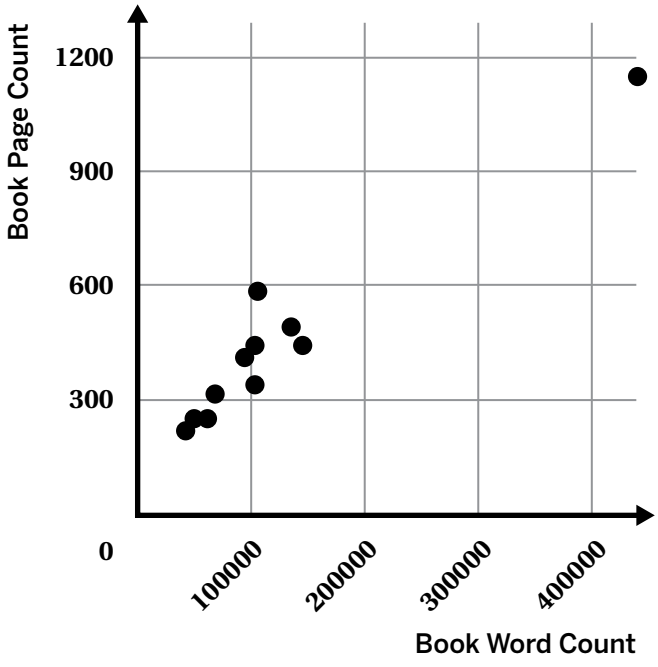
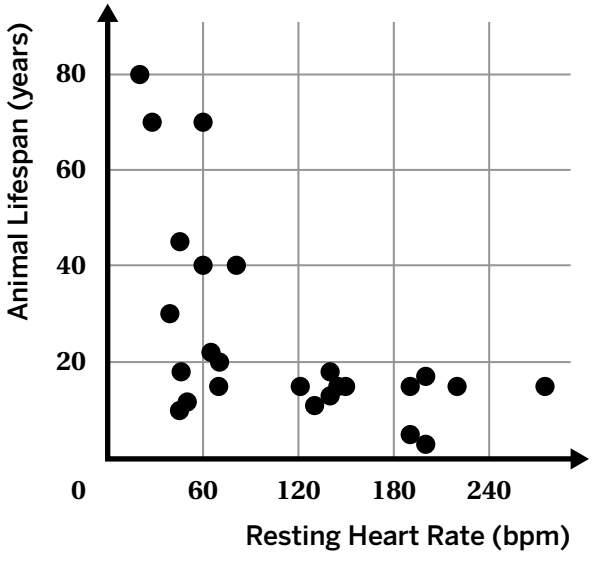
Fuel Efficiency



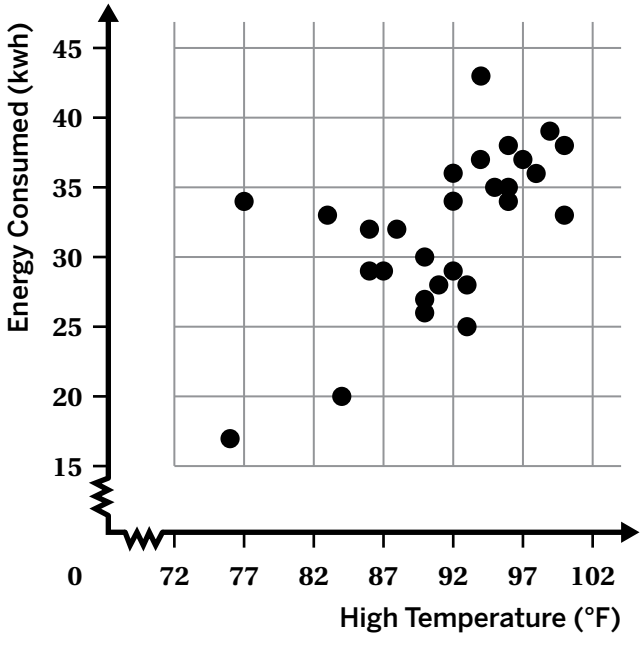
Book Page Count



Animal Lifespan



Energy Use



Challenge Creator

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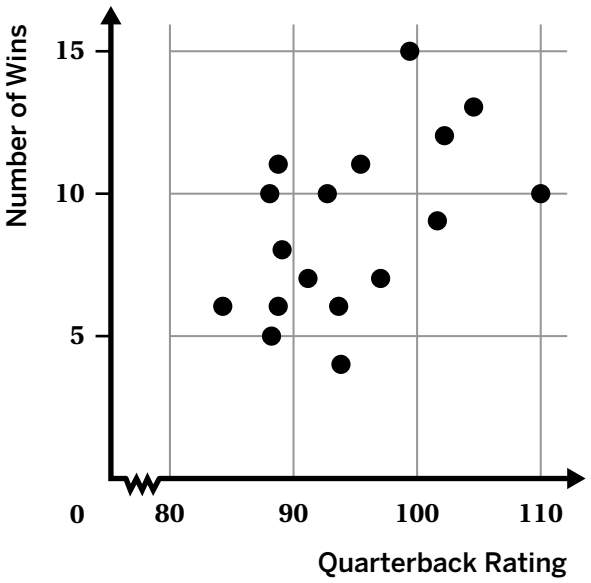
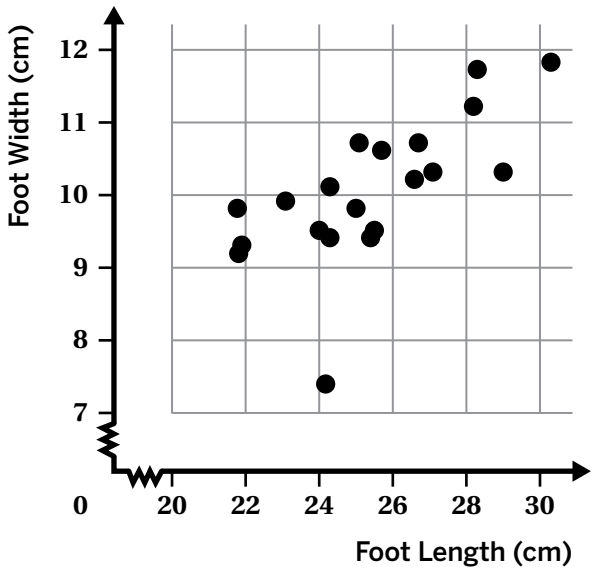
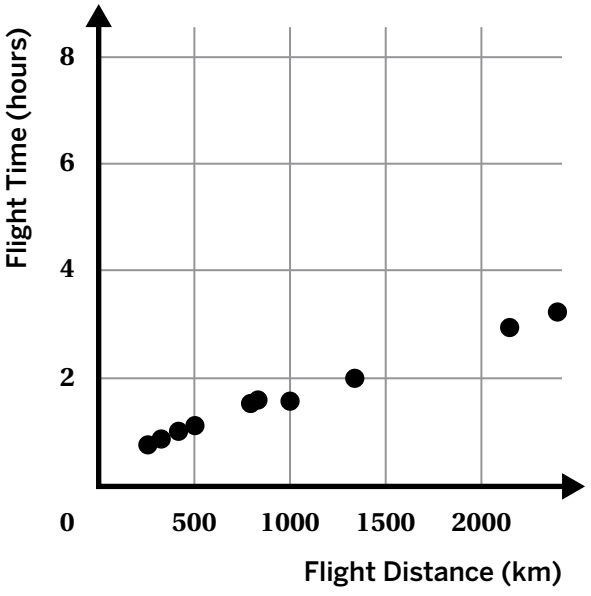
Quarterback Wins



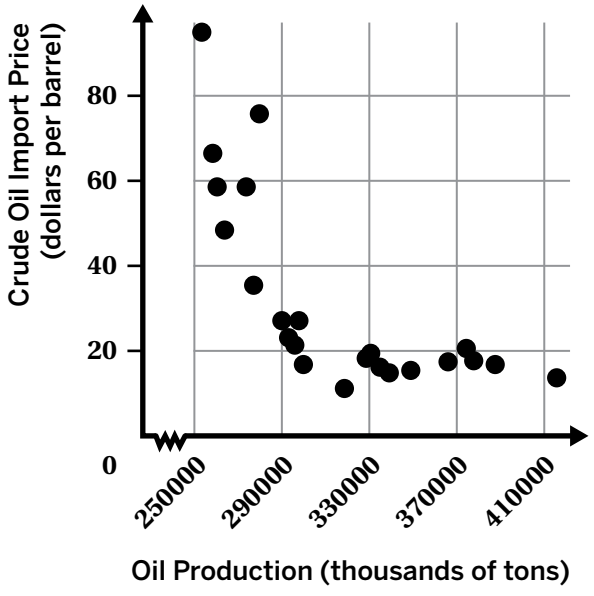
Foot Width



Flight Time



Oil Imports



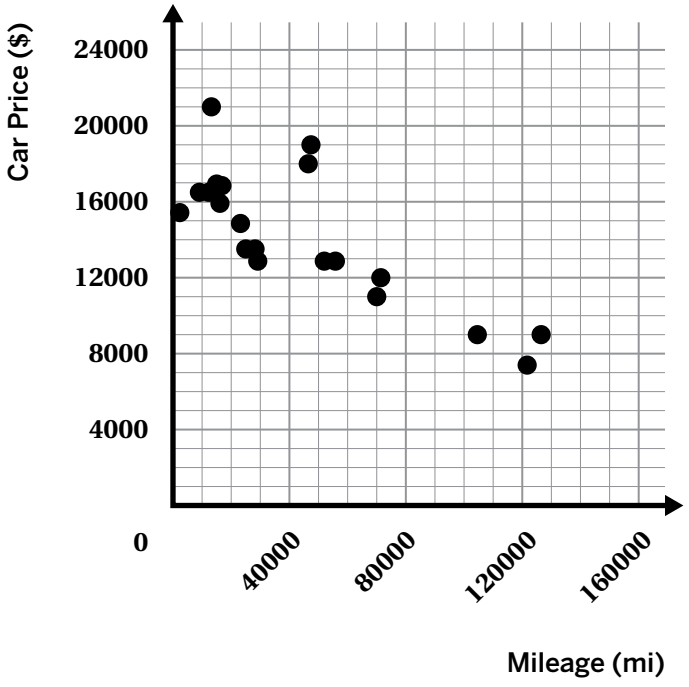
Scavenger Hunt

Trapezoid Sheet

B

Problem:

Based on this data, approximately what is the cost of a car with 60,000 miles?



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Scavenger Hunt

Circle Sheet

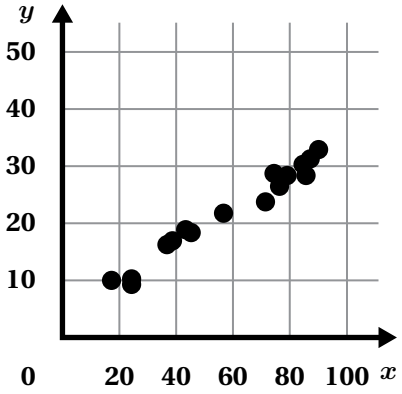
Answer

12,000

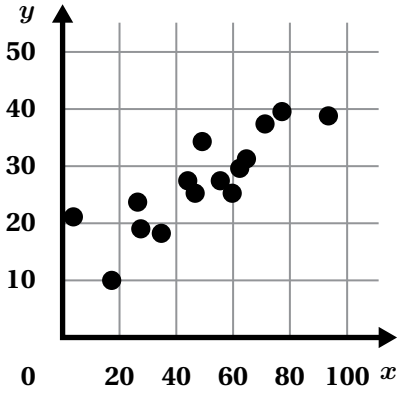
Problem:

Which scatter plot matches the table?

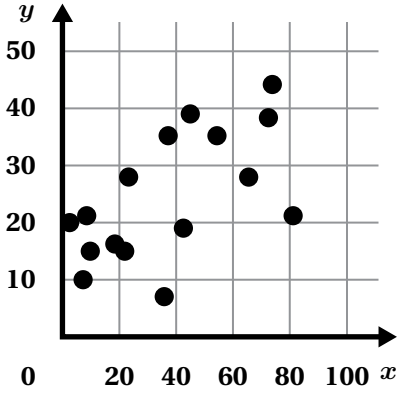
A.



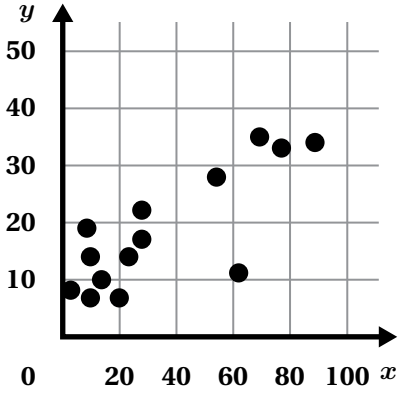
B.



C.



D.



x	y
66	28
43	18.5
3	19.5
24	28
22	15
38	35
19	15.5
74	44
10	15
81	20.5
73	37.5
55	34.5
45	38.5
36	7
9	20.5
8	10

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Scavenger Hunt

Pentagon Sheet

Answer

C

Problem:

Select *all* the representations that are appropriate for comparing top speed to engine size for five different cars.

- ☐ **A.** Histogram
- ☐ **B.** Scatter plot
- ☐ **C.** Dot plot
- ☐ **D.** Table
- ☐ **E.** Box plot

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Scavenger Hunt

Star Sheet

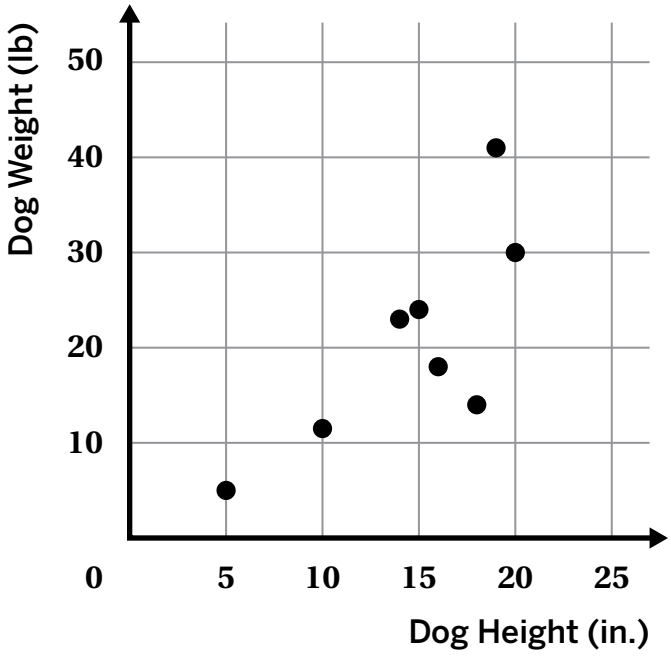
Answer

B and D

Problem:

Here is a scatter plot showing dog heights and weights.

What is the weight of the tallest dog on this scatter plot?



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Scavenger Hunt

Rectangle Sheet

Answer

30

Problem:

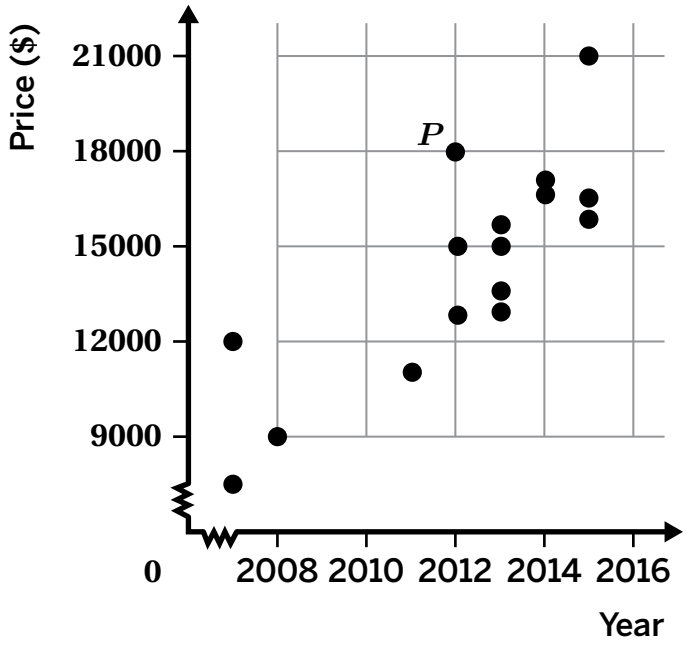
Describe point P.

A. In the year 2012, the price was $\$18{,}000$.

B. The price was $\$2012$ in the year $18{,}000$.

C. In the year 2012, the price was $\$15{,}000$.

D. The price was $\$18{,}000$ in the year 2010.



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Scavenger Hunt

△ Triangle Sheet

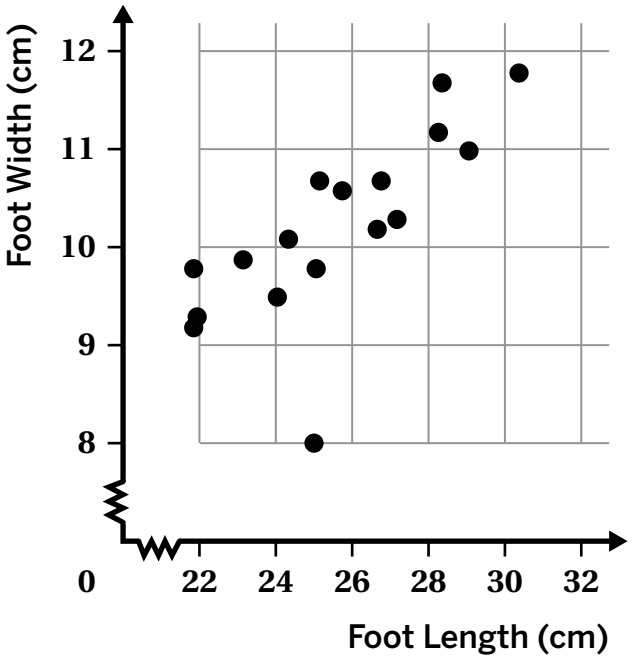
Answer

A

Problem:

Here is a scatter plot that compares the length and width of different people's feet.

What is the foot length of the person represented by the point that is an outlier?



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Name: ..... Date: ..... Period: .....

Scavenger Hunt

Octagon Sheet

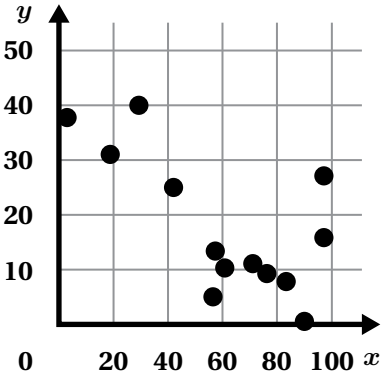
Answer

25

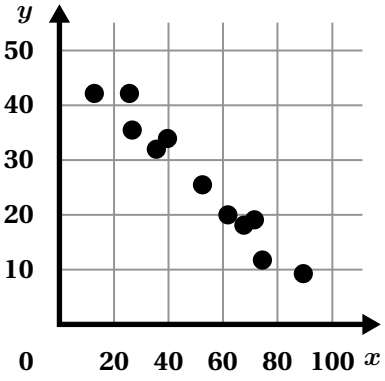
Problem:

Which scatter plot matches the table?

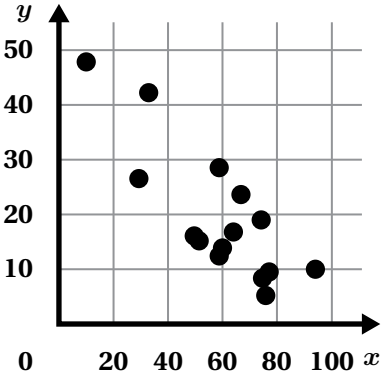
A.



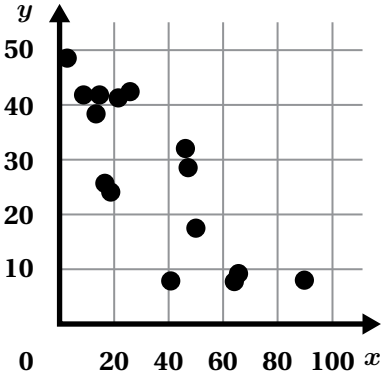
B.



C.



D.



Height (cm)	Foot Length (cm)
90	8
66	9
22	41.3
15	42
41	7.7
46	32.3
14	38.7
19	24.3
3	49
26	42.7
64	7.7
17	25.7
50	17.7
47	28.7
9	42

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Scavenger Hunt

Crescent Sheet

Answer

D

Problem:

Select *all* of the representations that are appropriate for comparing the amount of time spent studying and the score earned for 10 quizzes.

- ☐ **A.** Box plot
- ☐ **B.** Dot plot
- ☐ **C.** Histogram
- ☐ **D.** Scatter plot
- ☐ **E.** Table

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Scavenger Hunt

Hexagon Sheet

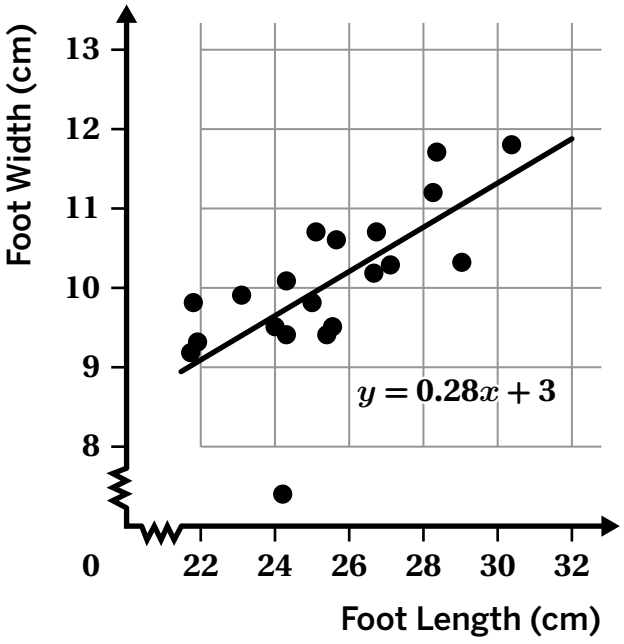
Answer

D and E

Problem:

This scatter plot shows the lengths and widths of 20 left feet, together with the graph of a model of the relationship between foot length and width.

Use the model to predict the width of a foot with a length of 22 centimeters.



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Scavenger Hunt

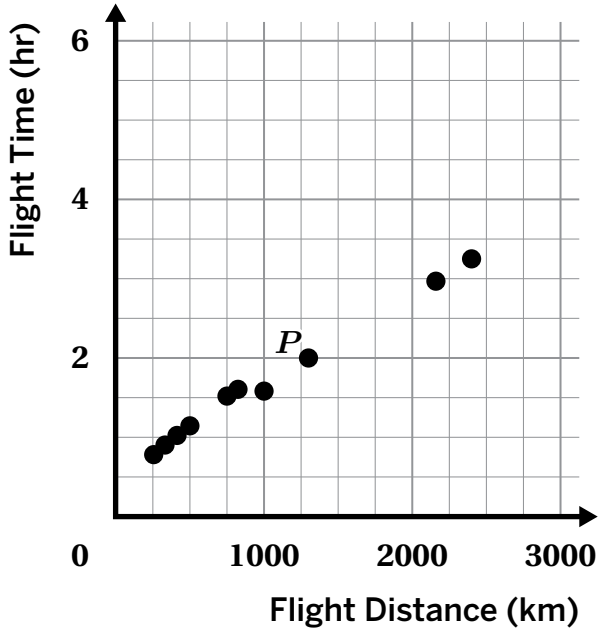
Oval Sheet

Answer

9.16

Problem:

Describe point P.



A. A flight distance of $1{,}250$ kilometers is 2 hours long.

B. A flight distance of $1{,}300$ kilometers is 2 hours long.

C. A flight distance of $1{,}250$ kilometers is 2.5 hours long.

D. A flight distance of $1{,}300$ kilometers is 2.5 hours long.

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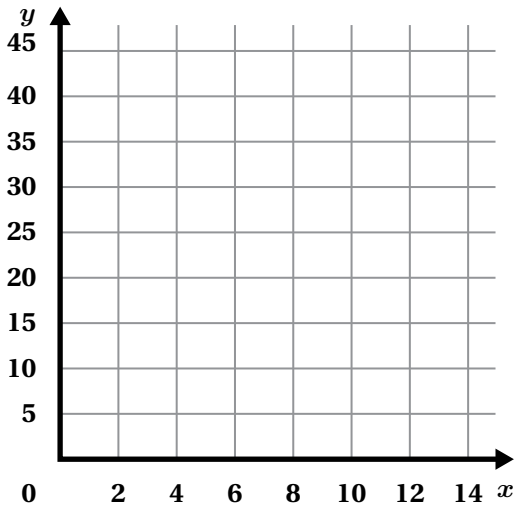
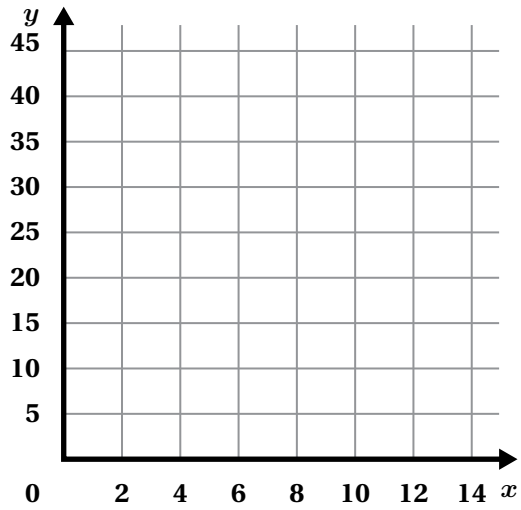
Name: Date: Period:

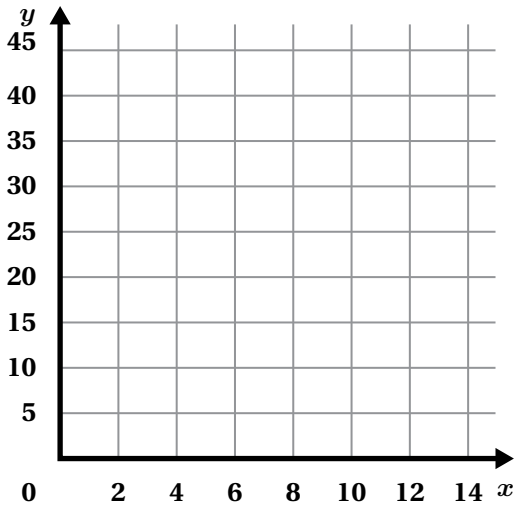
Challenge Creator

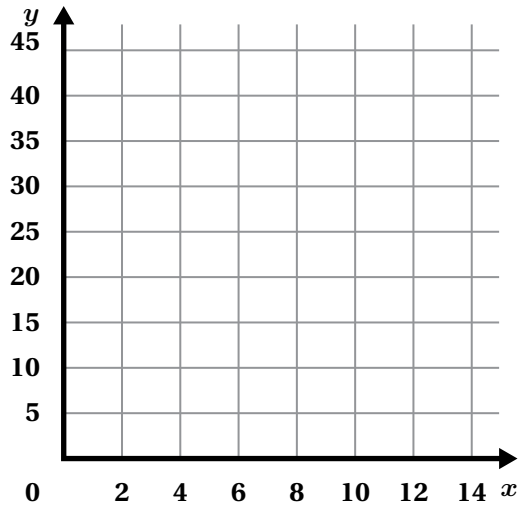
Create scatter plot challenges by completing these steps.

- Create a scatter plot with at least ten points.
- Pass your scatter plot to another student.
- Draw a line of fit for the data you received.
- Create a new scatter plot in the next available space.
- Repeat steps until everyone has drawn lines for four scatter plots.









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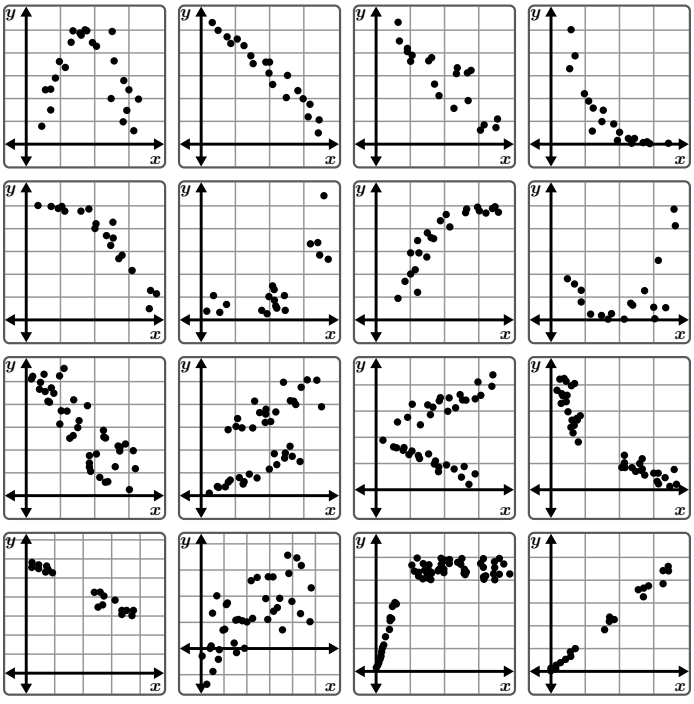
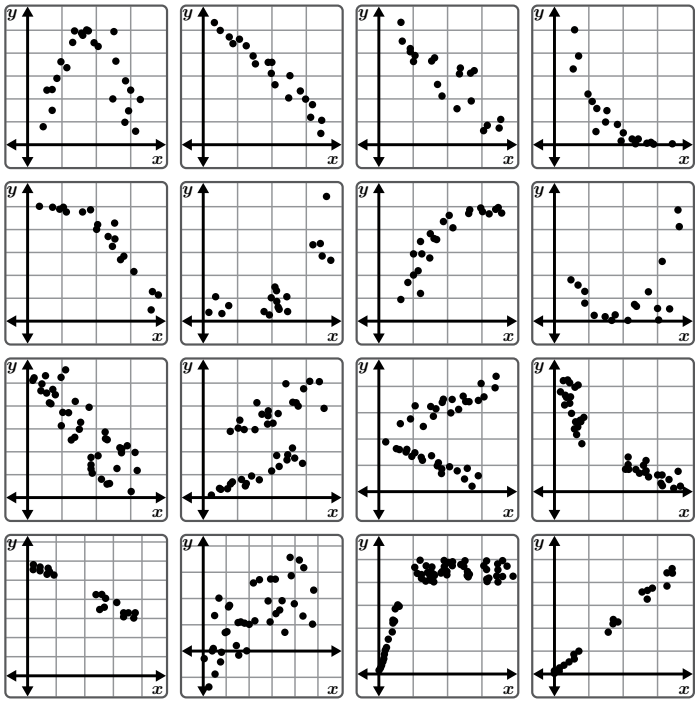
Name: ..... Date: ..... Period: .....

Polygraph Set A

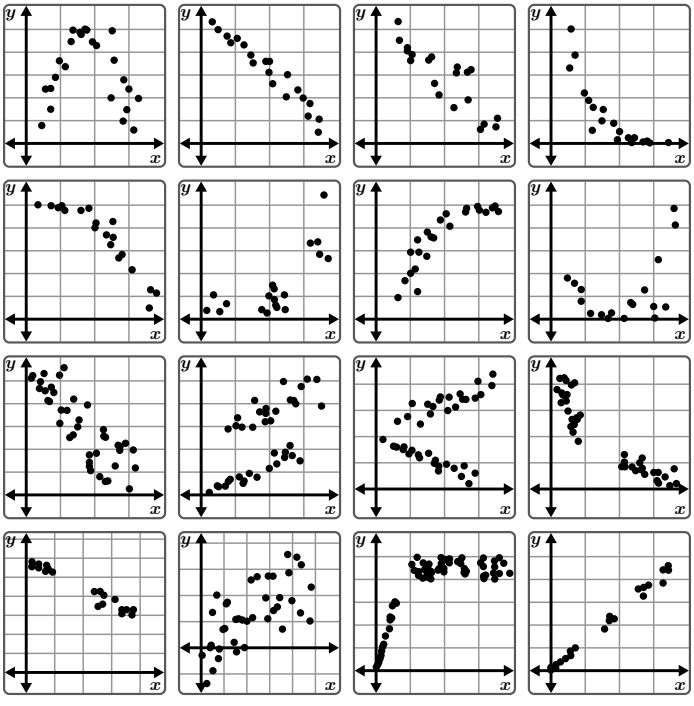
Round 1



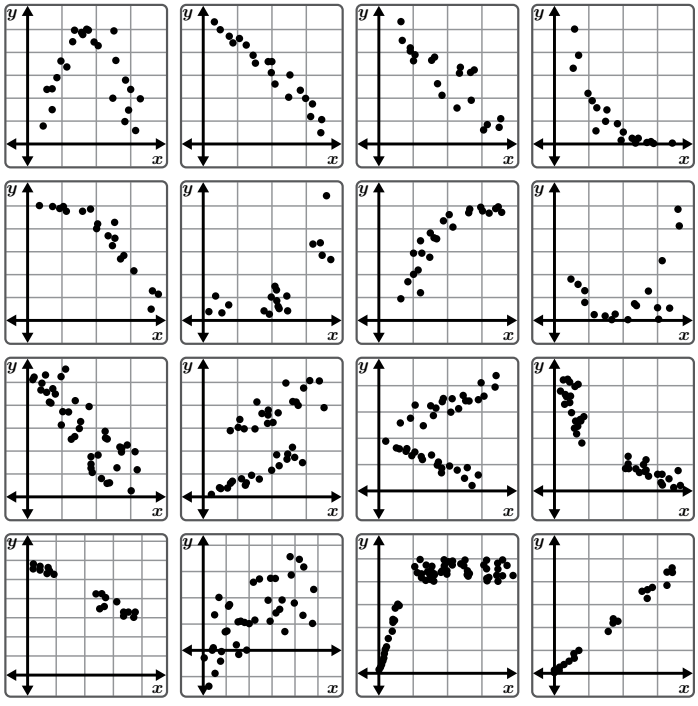
Round 2



Round 3



Round 4



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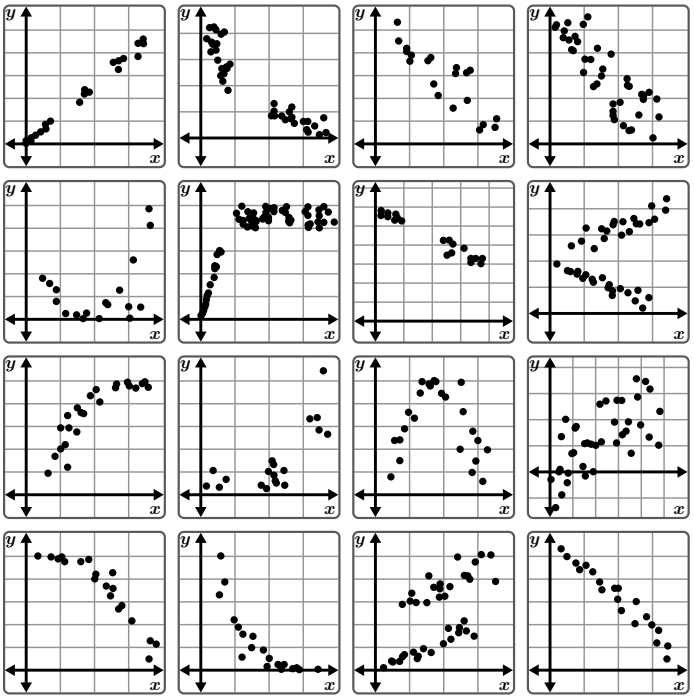
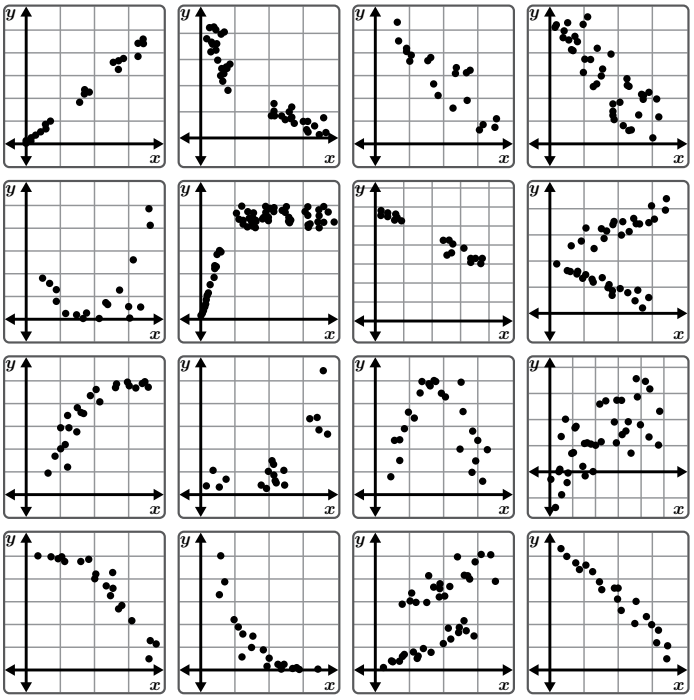
Name: ..... Date: ..... Period: .....

Polygraph Set B

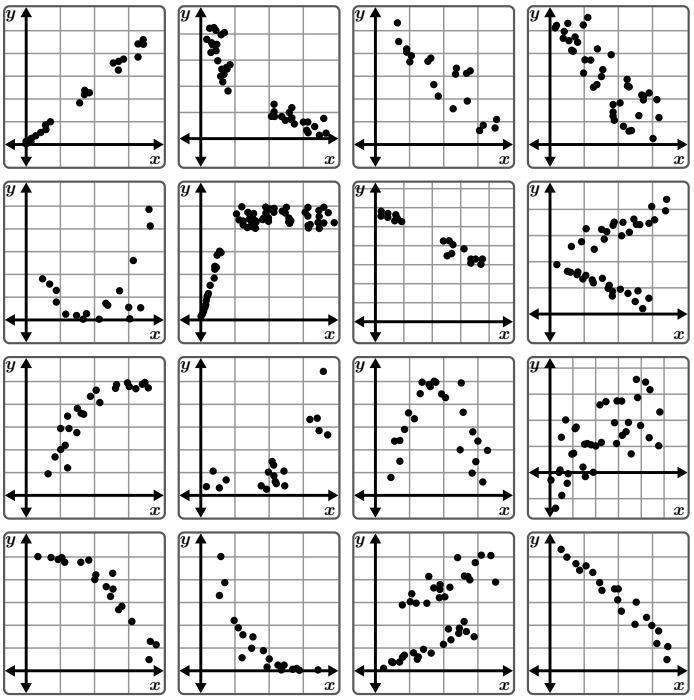
Round 1



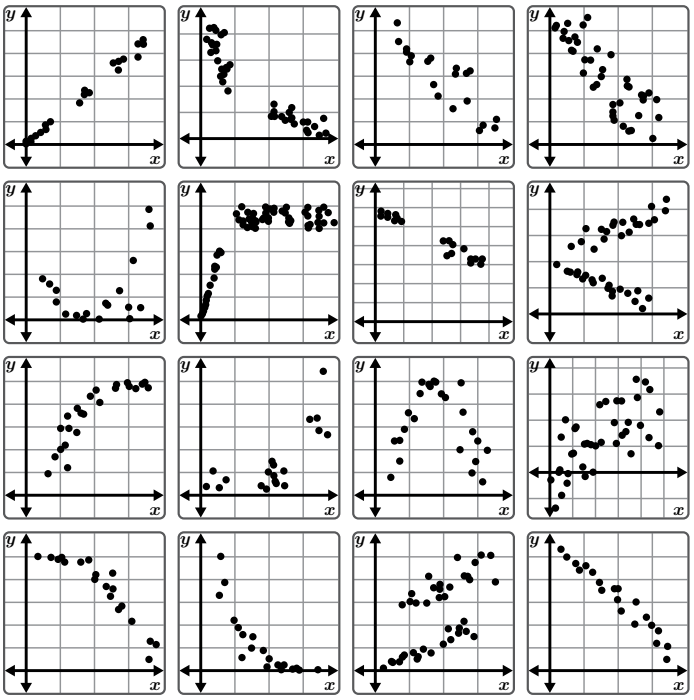
Round 2



Round 3



Round 4



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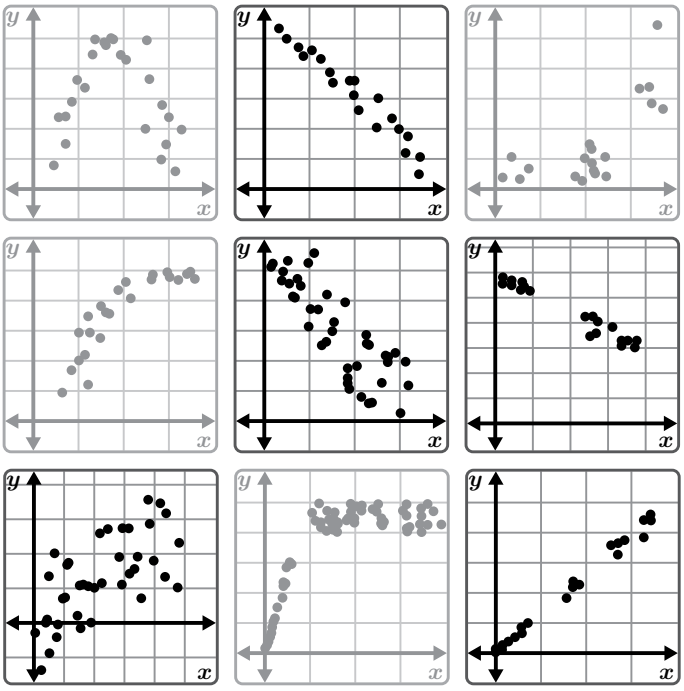
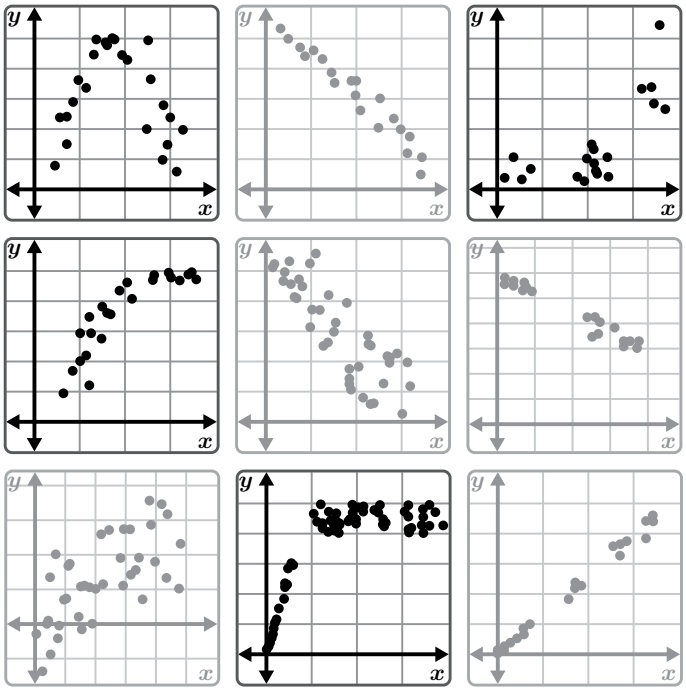
Name: Date: Period:

Scatter Plot City

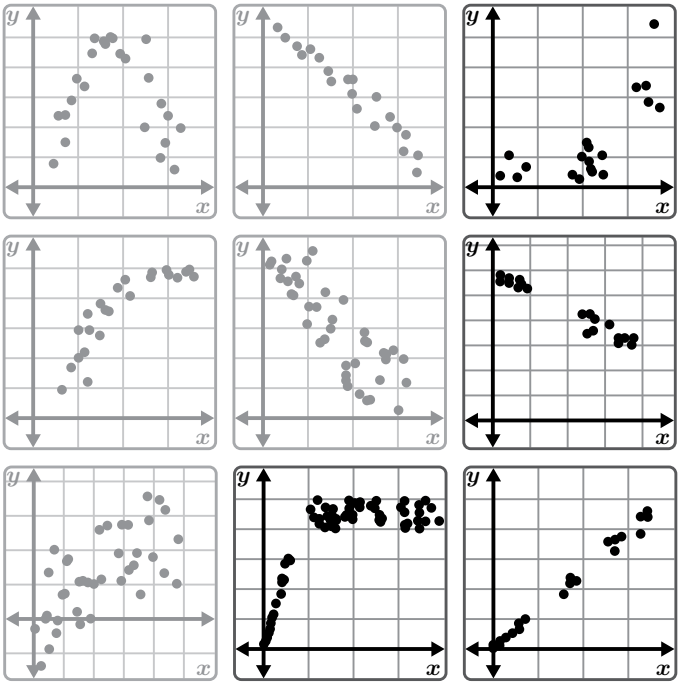
Linear Association



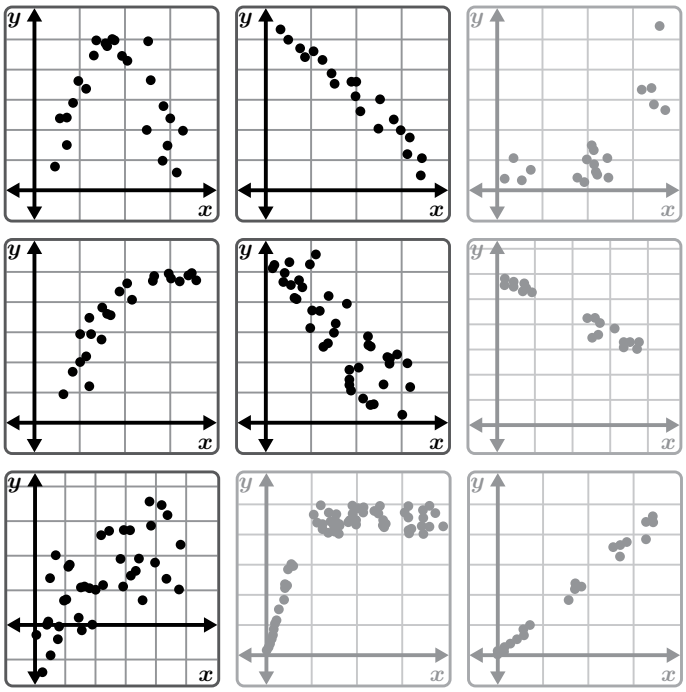
Non-Linear Association



With Clusters



Without Clusters



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Unit 9
Activity Sheets and Cards

Power Pairs

Directions: Make one copy per group. Then pre-cut the cards and give each group one set.

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Card A $16 \cdot 2$	**Card B** $(5 \cdot 5) \cdot (2 \cdot 2)$	**Card C** 5^6	**Card D** 4^3
Card E $2^4 \cdot 2^2$	**Card F** 2^5	**Card G** $5^4 \cdot 5^2$	**Card H** 25^4
Card I 10^4	**Card J** $25 \cdot 25 \cdot 25 \cdot 25$	**Card K** 10^2	**Card L** $(2^3)^2$
Card M $(5^4)^2$	**Card N** $(10^1)^4$	**Card O** $2^3 \cdot 2 \cdot 2 \cdot 2$	**Card P** 100
Card Q $5^2 \cdot 2^2$	**Card R** $10 \cdot 10 \cdot 10 \cdot 10$	**Card S** $5^3 \cdot 5^2 \cdot 5^3$	**Card T** $10{,}000$

Rules for Exponents

Directions: Make two copies per group. Then pre-cut the cards and give each group two sets.

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Card A

$(-7)^0 = 1$

Card B

$\frac{(0.5)^8}{(0.5)^3} = (0.5)^5$

Card C

$(5^3)^4 = 5^{12}$

Card D

$(10^2)^{-3} = 10^{-6}$

Card E

$\left(\frac{3}{5}\right)^4 \cdot \left(\frac{3}{5}\right)^2 = \left(\frac{3}{5}\right)^6$

Card F

$10^{-2} = \frac{1}{10^2}$

Card G

$5^4 \cdot \left(\frac{1}{2}\right)^4 = \left(\frac{5}{2}\right)^4$

Card H

$10^{11} = 2^{11} \cdot 5^{11}$

Card I

$\frac{10^2}{10^7} = 10^{-5}$

Card J

$(2.98)^0 = 1$

Card K

$\frac{1}{10^3} = 10^{-3}$

Card L

$10^{14} \cdot 10^1 \cdot 10^{-2} = 10^{13}$

Unit 10
Activity Sheets and Cards

Perfect Squares

1^2	1	$\sqrt{1} = 1$
2^2	4	$\sqrt{4} = 2$
3^2	9	$\sqrt{9} = 3$
4^2	16	$\sqrt{16} = 4$
5^2	25	$\sqrt{25} = 5$
6^2	36	$\sqrt{36} = 6$
7^2	49	$\sqrt{49} = 7$
8^2	64	$\sqrt{64} = 8$
9^2	81	$\sqrt{81} = 9$
10^2	100	$\sqrt{100} = 10$
11^2	121	$\sqrt{121} = 11$
12^2	144	$\sqrt{144} = 12$
13^2	169	$\sqrt{169} = 13$
14^2	196	$\sqrt{196} = 14$
15^2	225	$\sqrt{225} = 15$

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Perfect Cubes

1^3	1	$\sqrt[3]{1} = 1$
2^3	8	$\sqrt[3]{8} = 2$
3^3	27	$\sqrt[3]{27} = 3$
4^3	64	$\sqrt[3]{64} = 4$
5^3	125	$\sqrt[3]{125} = 5$

$(-1)^3$	-1	$\sqrt[3]{1} = -1$
$(-2)^3$	-8	$\sqrt[3]{8} = -2$
$(-3)^3$	-27	$\sqrt[3]{27} = -3$
$(-4)^3$	-64	$\sqrt[3]{64} = -4$
$(-5)^3$	-125	$\sqrt[3]{125} = -5$

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True for Every Triangle?

Directions: Make one copy per pair. Pre-cut the cards and distribute them so that each pair receives one set.

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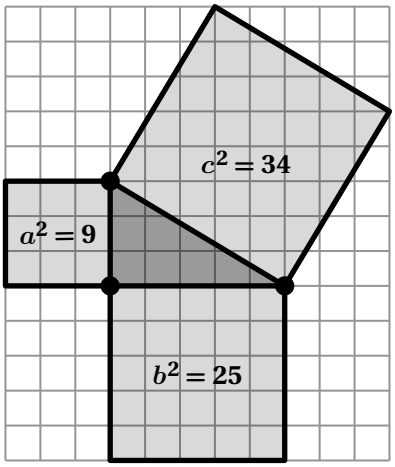
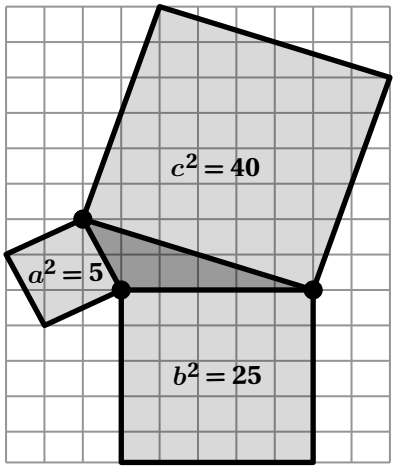
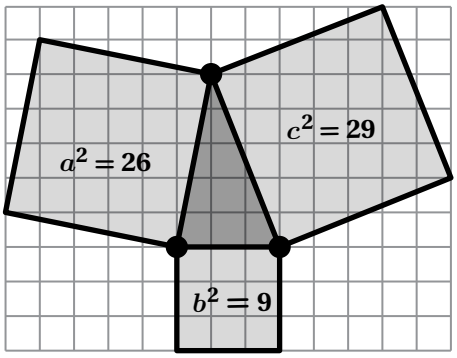
Card 1



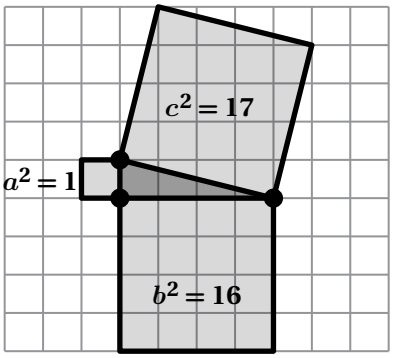
Card 2



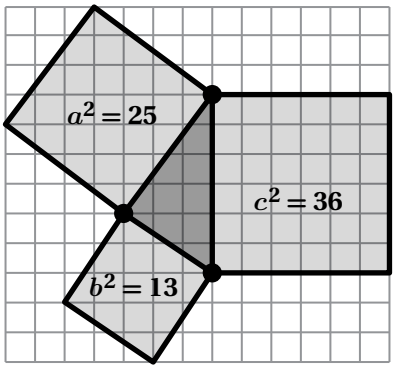
Card 3



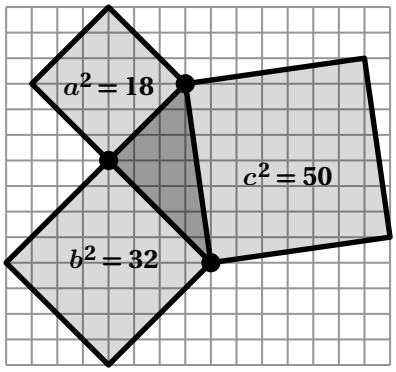
Card 4



Card 5



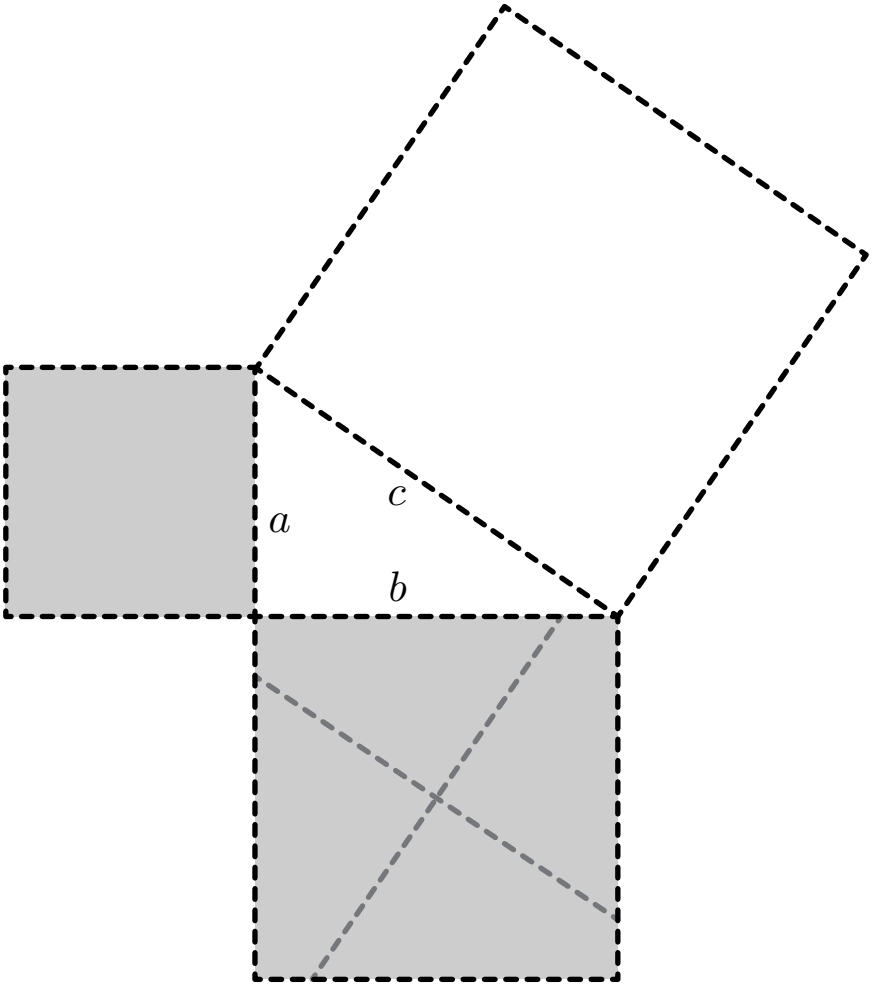
Card 6



Explore More

a. Use scissors to cut along the dashed lines. Arrange the pieces in the smaller squares to fit in the large square.

b. Describe what you notice about the relationship between the areas of the two smaller squares and the area of the large square.



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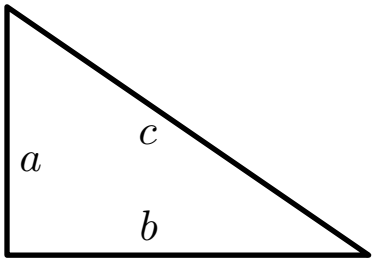
Explore More (answers)

a. Use scissors to cut along the dashed lines. Arrange the pieces in the smaller squares to fit in the large square.



b. Describe what you notice about the relationship between the areas of the two smaller squares and the area of the large square.

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Is the Converse True?

Directions: Make one copy for every four students. Pre-cut the cards and distribute them so that each student receives one set of line segments. Have students cut out the line segments.

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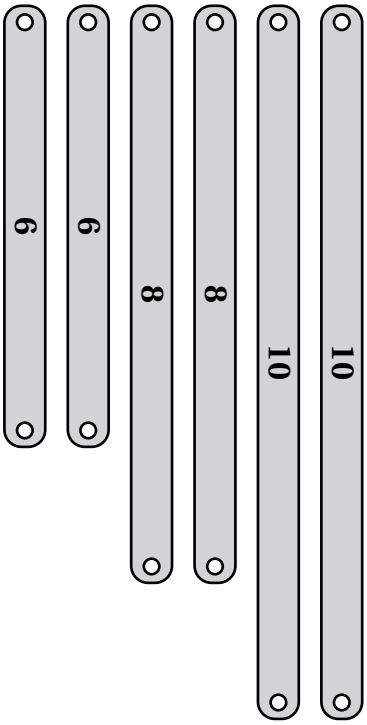

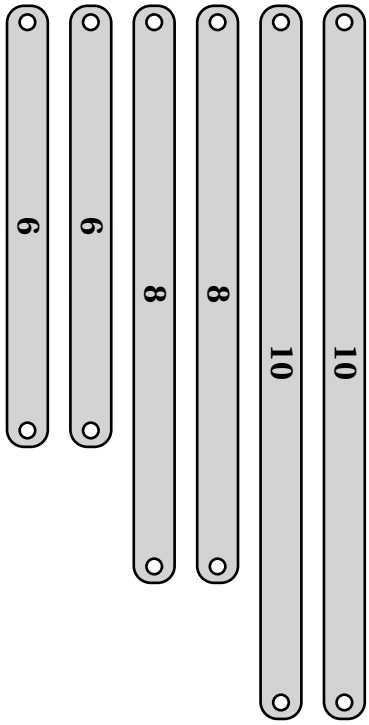

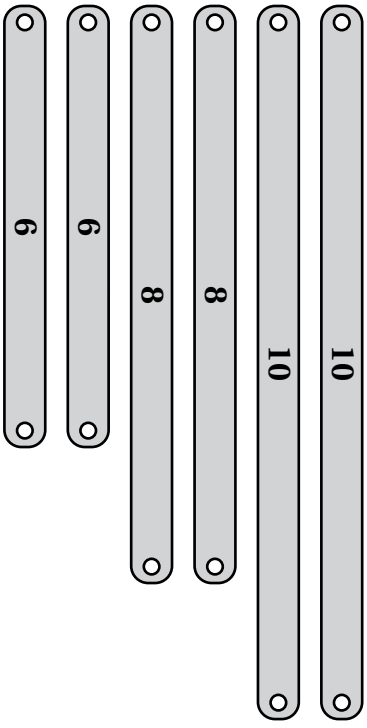

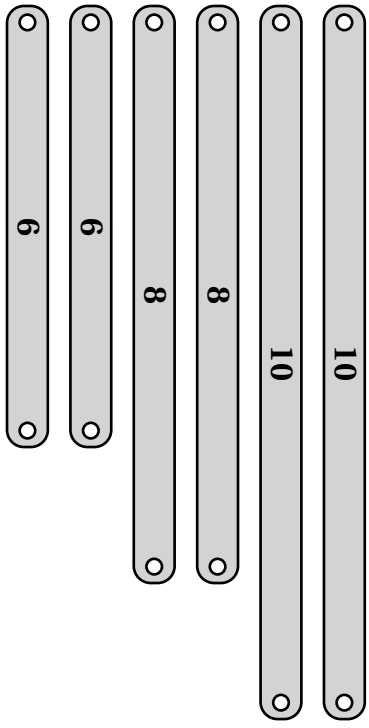

Line Segments

Directions: Make one copy per two students. Then pre-cut the cards and give each student one set of line segments. Have students cut out the line segments.

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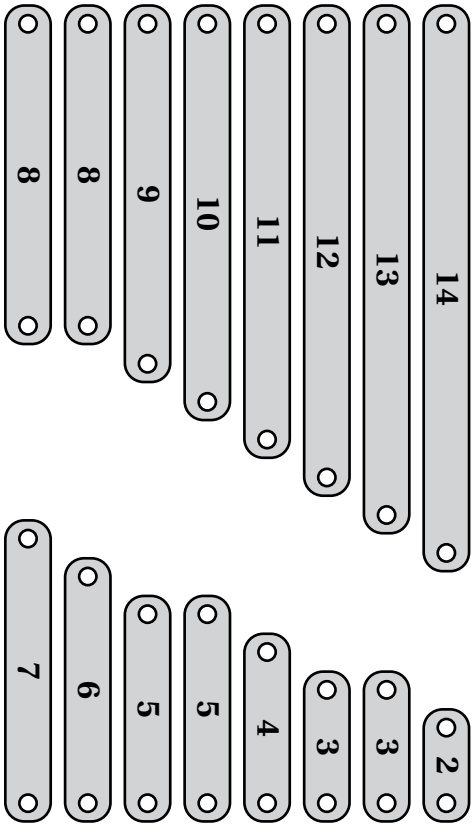

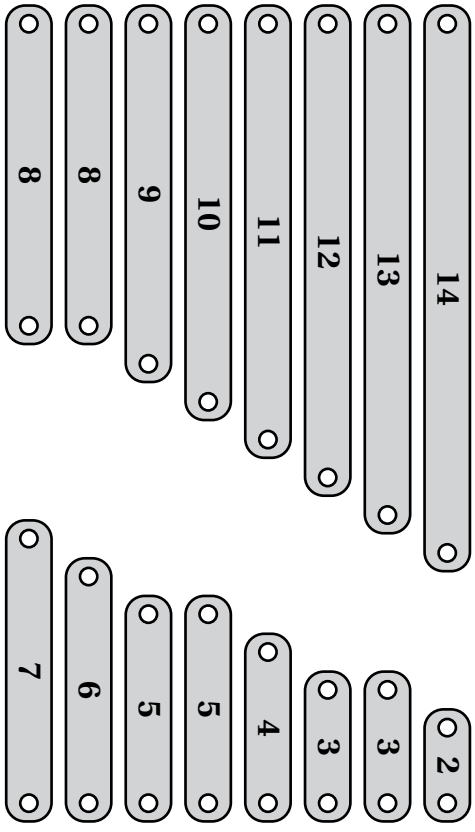

Not Too Long, Not Too Short

Directions: Make one copy per four students. Then pre-cut the cards and give each student one card to write their own challenge.

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_____'s Challenge

Given Length	Given Length

Select the correct length of the third segment.

A. _____ units

B. _____ units

C. _____ units

_____'s Challenge

Given Length	Given Length

Select the correct length of the third segment.

A. _____ units

B. _____ units

C. _____ units

_____'s Challenge

Given Length	Given Length

Select the correct length of the third segment.

A. _____ units

B. _____ units

C. _____ units

_____'s Challenge

Given Length	Given Length

Select the correct length of the third segment.

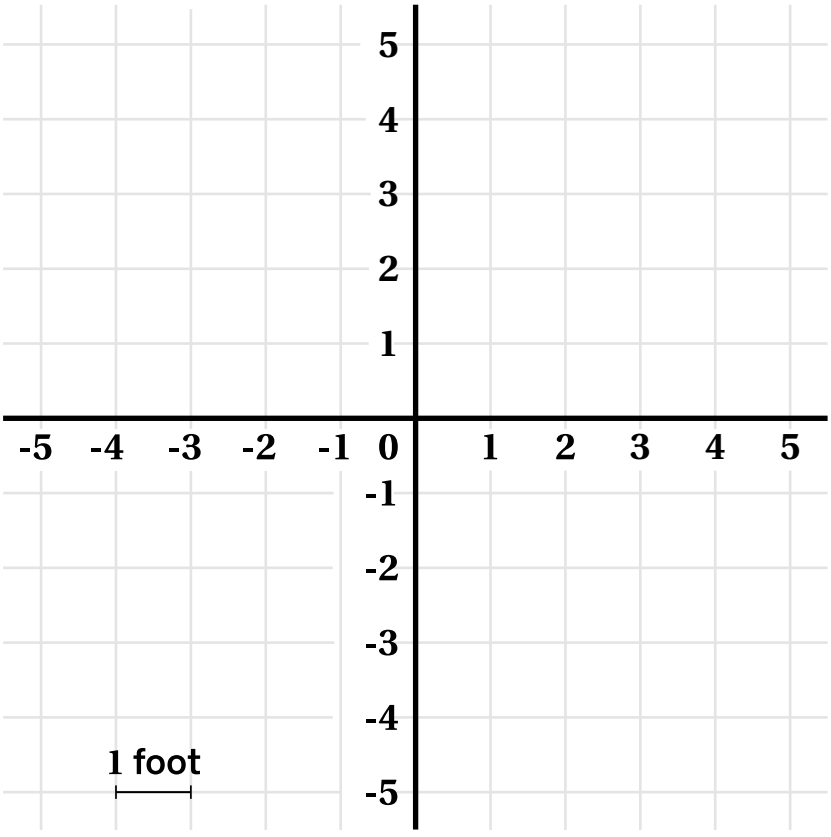
A. _____ units

B. _____ units

C. _____ units

Challenge Creator

- Sketch five lily pads and a rock on the coordinate plane. The rock and lily pads must be at least 2 feet apart from each other.
- Label the coordinates of the rock and lily pads, then sketch a frog on top of the rock or label it with an F.
- Do *not* show any distances between the rock and lily pads. You and your classmates will solve each other's challenges on the lesson page.



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