

Assessment and Lesson Resources

Inside you'll find:

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

Amplify Desmos Math **FLORIDA**

Grade 8

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.

Amplify Desmos Math Florida is based on curricula from Illustrative Mathematics (IM). IM 6–8 Math was originally developed by Open Up Resources and authored by Illustrative Mathematics, and is © 2017–2019 Open Up Resources. Additional adaptations and updates to IM 6–8 Math are © 2019 Illustrative Mathematics. IM 6–8 Math is licensed under the Creative Commons Attribution 4.0 International license (CC BY 4.0). Additional modifications contained in Amplify Desmos Math are © 2023 Amplify Education, Inc. and its licensors. Amplify is not affiliated with the Illustrative Mathematics organization.

The *Universal Design for Learning Guidelines* version 2.2 were developed by the Center for Applied Special Technology (CAST). © 2018 CAST.

The “Effective Mathematics Teaching” practices were developed by the National Council of Teachers (NCTM) in *Principles to Actions: Ensuring Mathematical Success for All*. © 2014 NCTM.

The “Procedural Fluency in Mathematics” practices were developed by the National Council of Teachers of Mathematics (NCTM) in *Procedural Fluency: Reasoning and Decision-Making, Not Rote Application of Procedures Position*. © 2023 NCTM.

Desmos® is a registered trademark of Desmos Studio PBC.

Notice and Wonder® and I Notice/I Wonder™ are trademarks of the National Council of Teachers. Amplify Desmos Math is not sponsored, endorsed by, or affiliated with the National Council of Teachers.

No part of this publication may be reproduced or distributed in any form or by any means without the prior written consent of Amplify Education, Inc., except for the classroom use of the worksheets included for students in some lessons, or as otherwise permitted under the Acceptable Use Policy posted on our website, which is subject to change at any time without notice to you and/or your organization.

Amplify gratefully acknowledges the work of distinguished program advisors from English Learners Success Forum (ELSF), who have been integral in the development of Amplify Desmos Math. ELSF is a 501(c)(3) nonprofit organization whose mission is to expand educational equity for multilingual learners by increasing the supply of high-quality instructional materials that center their cultural and linguistic assets.

© 2028 Amplify Education, Inc.
55 Washington Street, Suite 800
Brooklyn, NY 11201
www.amplify.com

ISBN: 9798895804759
Printed in [e.g., the United States of
America][# of print run] [print vendor]
[year of printing]

Contents

Assessment Resources

Unit 1 Rigid Transformations and Congruence 3

Assessments & Rubrics	3	Show What You Know	31
Pre-Unit Check	5	Show What You Know Pages	33
Sub-Unit Quiz 1 & Rubric	7	Show What You Know Answers	43
End-of-Unit Assessment & Rubric Form A	14		
End-of-Unit Assessment & Rubric Form B	22		

Unit 2 Dilations, Similarity, and Slope 47

Assessments & Rubrics	47	Show What You Know	75
Pre-Unit Check	49	Show What You Know Pages	77
Sub-Unit Quiz 1 & Rubric	51	Show What You Know Answers	87
End-of-Unit Assessment & Rubric Form A	56		
End-of-Unit Assessment & Rubric Form B	65		

Unit 3 Proportional and Linear Relationships 91

Assessments & Rubrics	91	Show What You Know	121
Pre-Unit Check	93	Show What You Know Pages	123
Sub-Unit Quiz 1 & Rubric	95	Show What You Know Answers	134
End-of-Unit Assessment & Rubric Form A	101		
End-of-Unit Assessment & Rubric Form B	111		

Unit 4 Linear Equations and Linear Systems 137

Assessments & Rubrics	137	Show What You Know	169
Pre-Unit Check	139	Show What You Know Pages	171
Sub-Unit Quiz 1 & Rubric	142	Show What You Know Answers	181
End-of-Unit Assessment & Rubric Form A	148		
End-of-Unit Assessment & Rubric Form B	158		

Unit 5 Functions 185

Assessments & Rubrics	185	Show What You Know	215
Pre-Unit Check	187	Show What You Know Pages	217
Sub-Unit Quiz 1 & Rubric	189	Show What You Know Answers	224
End-of-Unit Assessment & Rubric Form A	196		
End-of-Unit Assessment & Rubric Form B	205		

Contents (continued)

Unit 6 Associations in Data	227		
Assessments & Rubrics	227	Show What You Know	249
Pre-Unit Check	229	Show What You Know Pages	251
Sub-Unit Quiz 1 & Rubric	231	Show What You Know Answers	260
End-of-Unit Assessment & Rubric Form A	237		
End-of-Unit Assessment & Rubric Form B	243		
Unit 7 Exponents and Scientific Notation	263		
Assessments & Rubrics	263	Show What You Know	289
Pre-Unit Check	265	Show What You Know Pages	291
Sub-Unit Quiz 1 & Rubric	267	Show What You Know Answers	304
End-of-Unit Assessment & Rubric Form A	273		
End-of-Unit Assessment & Rubric Form B	281		
Unit 8 The Pythagorean Theorem and Irrational Numbers	309		
Assessments & Rubrics	309	Show What You Know	331
Pre-Unit Check	311	Show What You Know Pages	333
Sub-Unit Quiz 1 & Rubric	313	Show What You Know Answers	348
End-of-Unit Assessment & Rubric Form A	317		
End-of-Unit Assessment & Rubric Form B	324		
Unit 9 Probability	353		
Assessments & Rubrics	353	Show What You Know	371
Pre-Unit Check	355	Show What You Know Pages	373
End-of-Unit Assessment & Rubric Form A	357	Show What You Know Answers	378
End-of-Unit Assessment & Rubric Form B	364		
Lesson Resources			
Unit 1: Activity Sheets & Cards	383	Unit 5: Activity Sheets & Cards	419
Unit 2: Activity Sheets & Cards	397	Unit 6: Activity Sheets & Cards	423
Unit 3: Activity Sheets & Cards	407	Unit 7: Activity Sheets & Cards	441
Unit 4: Activity Sheets & Cards	413	Unit 8: Activity Sheets & Cards	445

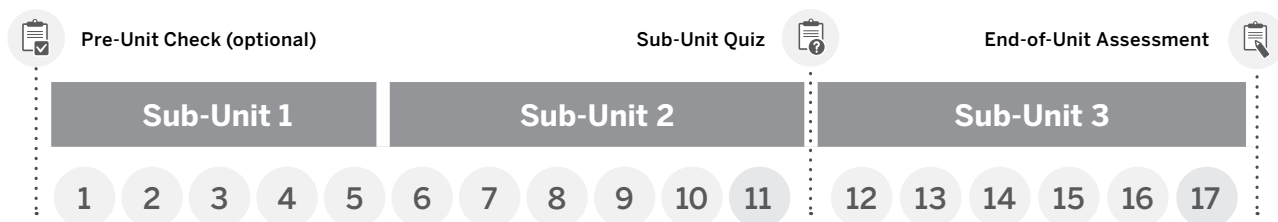
Assessment Overview

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

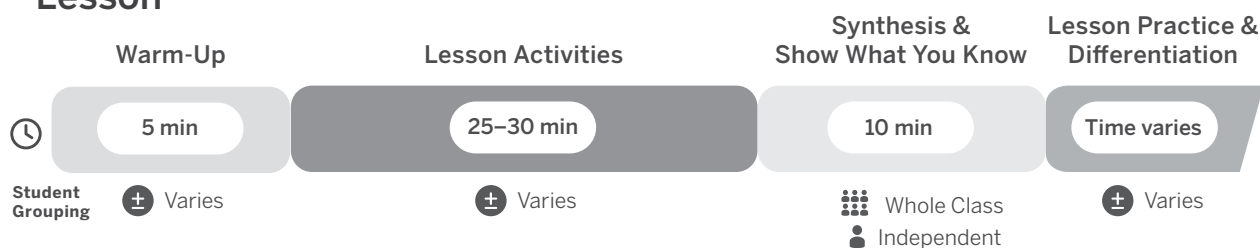


Unit



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.

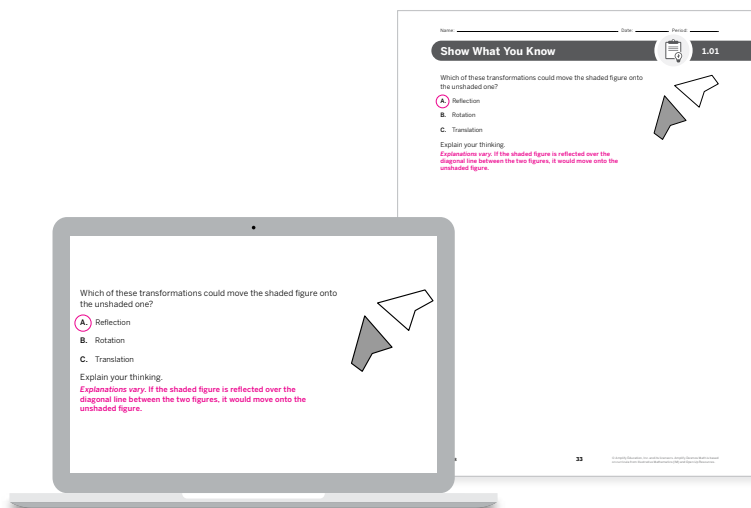
End-of-Lesson Assessment

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.



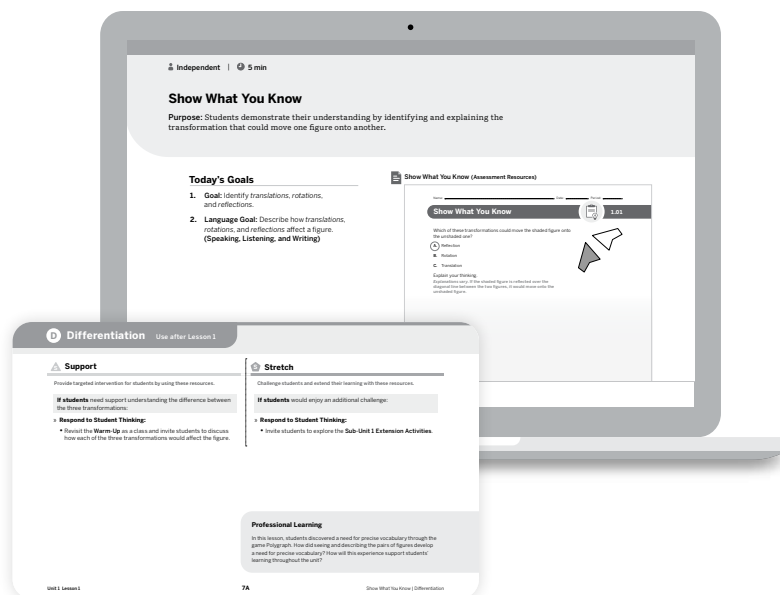
Differentiation Beyond the Lesson

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.



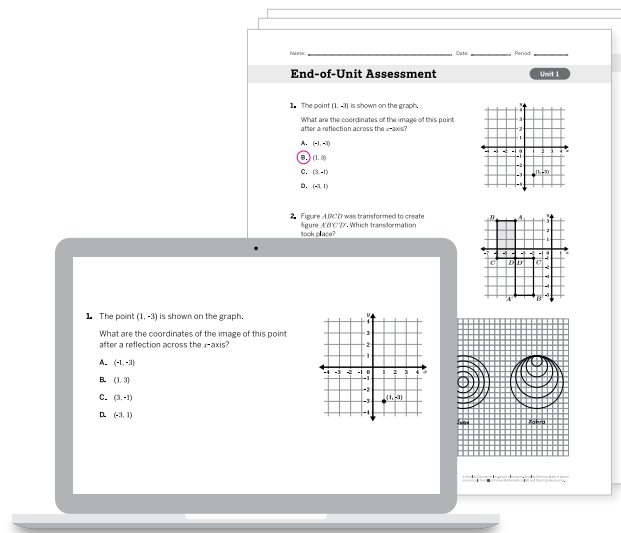
Sub-Unit Quizzes

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. Text to speech is available in the digital version.

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.

Sub-Unit Goals	Problem(s)	To respond to student thinking, consider:
Sub-Unit 1: • Analyze translations, reflections, and rotations on and off a grid. • Describe a translation, reflection, and rotation. (Lessons 1-6)	1	Suggest - Teacher Move: Consider reading Unit 1, Lesson 3 (Getting Coordinates, Part 2). Stretch - Challenge Reader: Lesson 4 (Getting Coordinates, Part 2).
	2	Suggest - Mini-Lesson: Describing Coordinates After a Rotation. Stretch - Teacher Move: Consider reading Unit 1, Lesson 4 (Getting Coordinates, Part 2). Stretch - Challenge Reader: Lesson 4 (Getting Coordinates, Part 2).
Sub-Unit 2: • Explain whether two figures are congruent using rigid transformations. • Justify whether two figures are congruent using rigid transformations, translation, reflection, rotation, and/or glide reflection. • Describe the characteristics of congruent figures using vocabulary (Lessons 7-9)	3	Suggest - Teacher Move: Consider reading Unit 1, Lesson 5 (Do Sides, No Directions). Stretch - Challenge Reader: Lesson 6 (Getting Coordinates, Part 2).
	4, 6a, 6b	Suggest - Mini-Lesson: Justifying Congruent Figures. Stretch - Teacher Move: Consider reading Unit 1, Lesson 7 (Are They Congruent?).
Sub-Unit 3: • Observe that the corresponding sides of triangles are congruent. • Use congruence relationships to determine unknown angle measurements. • Describe what it means for angles to be complementary or supplementary. (Lessons 6-10)	7a, 7b	Suggest - Teacher Move: Consider Reading. Stretch - Mini-Lesson: Are They The Same? • Unit 1, Lesson 7 (Are They Congruent?).
	7c	Suggest - Teacher Move: Consider reading Unit 1, Lesson 8 (Can It Happen). Stretch - Mini-Lesson: Describing Unknown Angle Measures. Stretch - Teacher Move: Consider reading Unit 1, Lesson 9 (Ready Angles).
	6a, 6b	Stretch - Teacher Move: Consider reading the Mini-Lesson Activity (Lesson 9). • Identify Angles: Have students determine the angle measures of the angles in Problem 6a and then use context. • Teacher Move: Have students design an angle puzzle that uses triangles and other angles to solve.

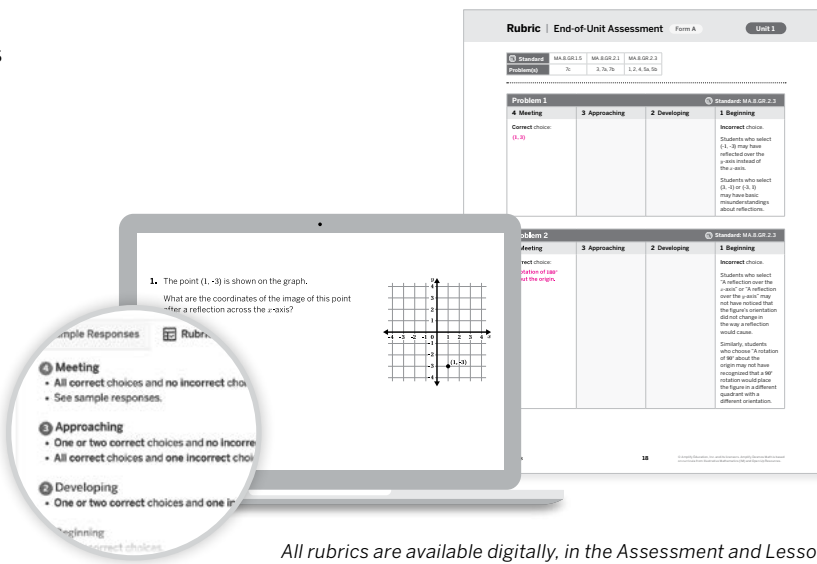
Assessment Rubrics and Grading

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

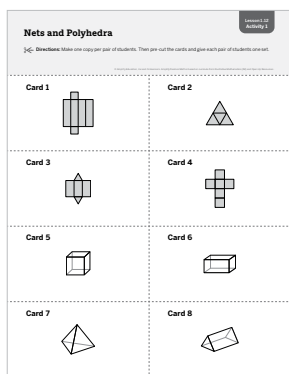
Some Amplify Desmos Math Florida lessons include Lesson Resources in addition to the Teacher and Student edition pages that help make learning more hands-on and collaborative.

Types of Lesson Resources

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

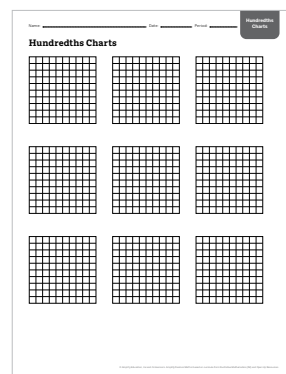
Activity Sheets and Cards

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.

Lesson Materials and Prep

Here are the materials and resources needed within each lesson, how to prepare them, and where to find them.

Lesson 1 Copy: Show What You Know: Activity 2 Sheet (one set per class) Materials: tracing paper (as needed)	Lesson 2 Copy: Show What You Know: Activity 2 Cards (one set per pair) Materials: 10 highlighters, tracing paper, coloring books (optional)	Lesson 3 Copy: Show What You Know: Activity 2 Sheet (one set per class)	Lesson 4 Copy: Show What You Know: Activity 2 Sheet (one set per class) Materials: tracing paper (as needed)
Lesson 5 Copy: Show What You Know: Activity 2 Cards (one set per pair) Materials: protractors, rulers, tracing paper, coloring tools, highlighters (as needed), red markers (as needed)	Lesson 6 Copy: Show What You Know: Activity 2 Cards (one set per pair) Materials: tracing paper (as needed)	Lesson 7 Copy: Show What You Know: Activity 2 Cards (one set per class)	Lesson 8 Copy: Show What You Know: Activity 2 Cards (one set per class) Materials: blank paper (one per student), 10 highlighters, tracing paper (as needed)
Lesson 9 Copy: Show What You Know: Activity 2 Cards (one set per class)	Lesson 10 Copy: Show What You Know: Activity 2 Cards (one set per class)		

Resource Books

Assessment and Lesson Resources <ul style="list-style-type: none"> • Pre-Unit Check • Unit-Unit Quiz • End-of-Unit Assessment, Forms A & B • Assessment Rubrics • Show What You Knows • Activity Sheets and Cards 	Intervention and Extension Resources <ul style="list-style-type: none"> • Mini-Lessons • Print-Grade Mini-Lessons • Extensions
--	--

Caregiver Support

These resources can be shared with students' caregivers. They provide background on the mathematics in this unit, as well as suggestions for supporting students at home.

181 20 Lesson Materials and Prep

Assessment Resources

Unit 1

Assessments and Rubrics

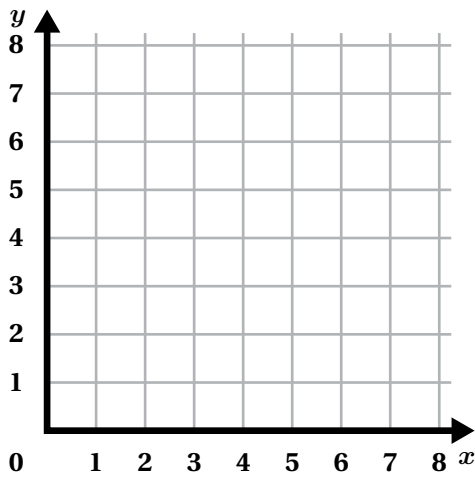
Pre-Unit Check

Unit 1

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

2. Here are four points.

a Plot these points on the coordinate plane.

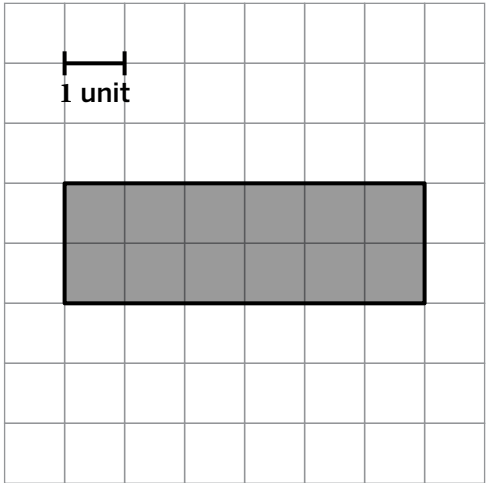


Point	Coordinates
A	(2, 1)
B	(5, 1)
C	(7, 2)
D	(4, 2)

b What is the length of segment CD ?

3. Here is a rectangle.

a Determine the *perimeter* of this rectangle.



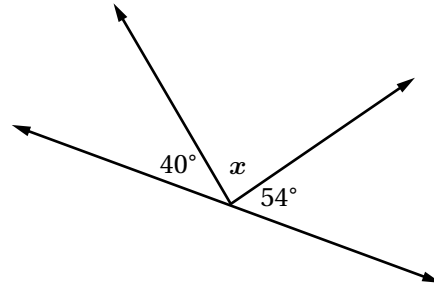
b Determine the *area* of this rectangle.

Pre-Unit Check (continued)

Unit 1

4. Determine the measure of angle x .

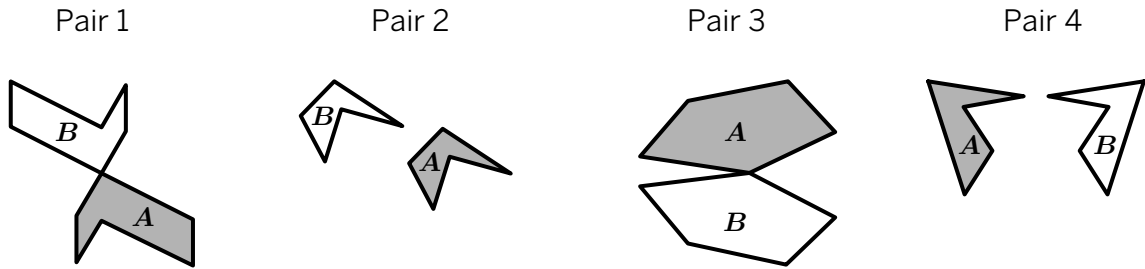
Explain your thinking.



Sub-Unit Quiz

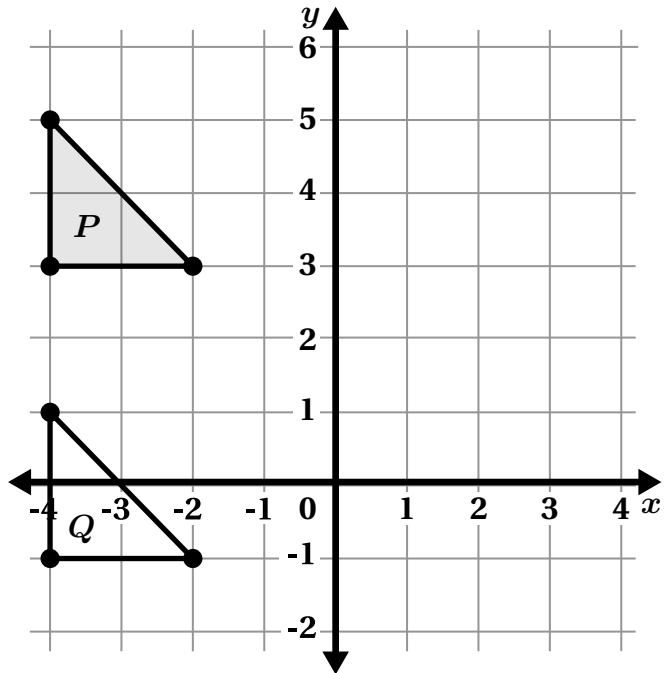
Unit 1

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



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

- A. A reflection
- B. A rotation
- C. A translation

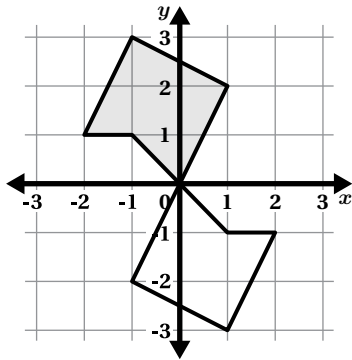


Sub-Unit Quiz (continued)

Unit 1

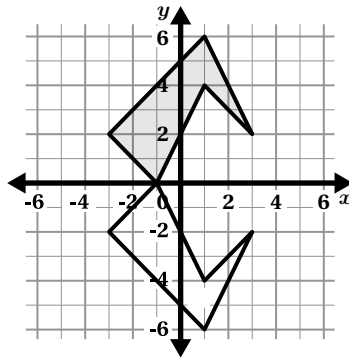
3. Here are three transformations.

- a** Which transformation moves figure E onto figure F?



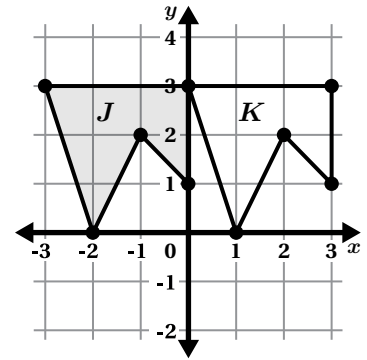
- A. Translation
- B. Rotation
- C. Reflection

- b** Which transformation moves figure G onto figure H?



- A. Translation
- B. Rotation
- C. Reflection

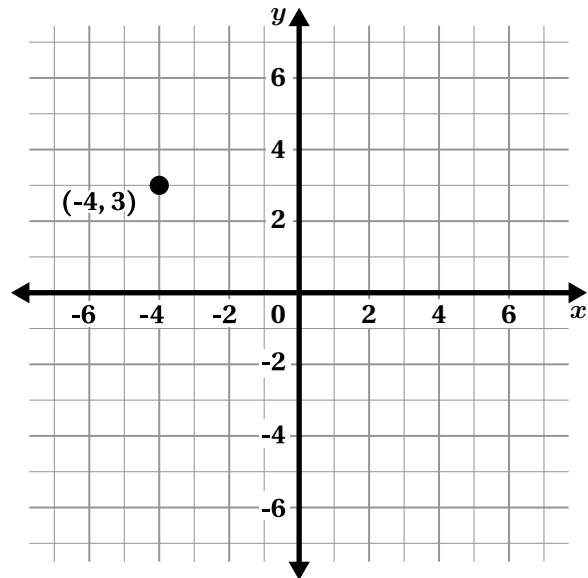
- c** Which transformation moves figure J onto figure K?



- 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.

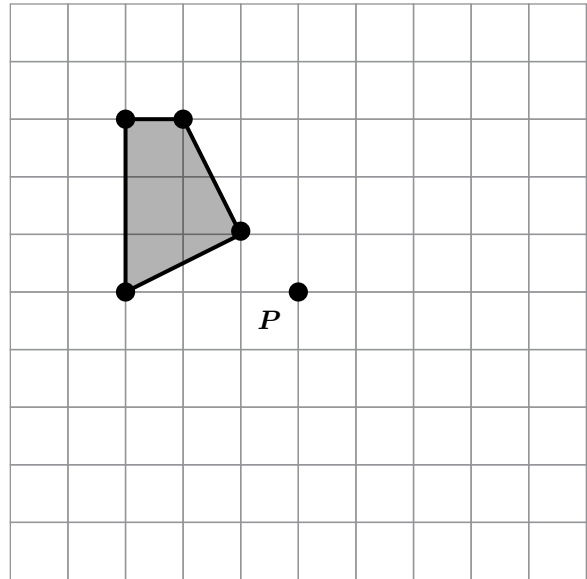
- a** The image of $(-4, 3)$ after a rotation of 180° around point $(0, 0)$.
- b** The image of $(-4, 3)$ after a translation 2 units to the right.
- c** The image of $(-4, 3)$ after a reflection over the y -axis.



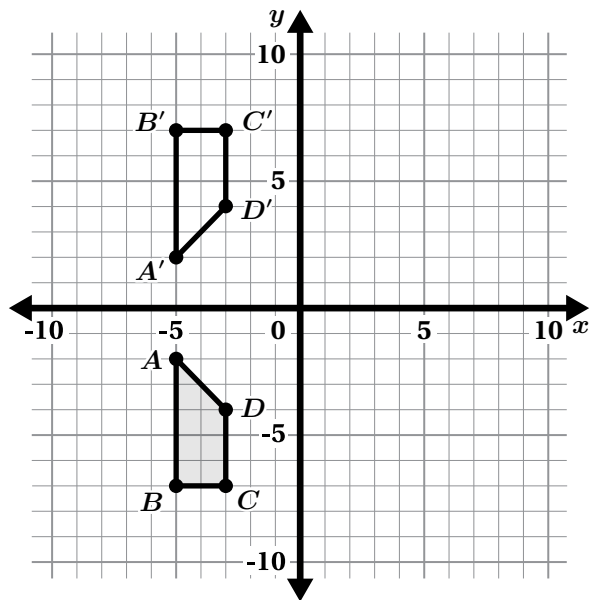
Sub-Unit Quiz (continued)

Unit 1

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
<p>Correct choice: Pair 1</p> 			<p>Incorrect choice.</p> <p>Students who select <i>Pair 3</i> may have confused rotations and reflections and may believe the common point between the two figures is the center of a 180° rotation.</p>

Problem 2			Standards: MA.8.GR.2.3, MTR.2.1
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice and no incorrect choices. A translation</p>	<p>One correct choice and one incorrect choice.</p>	<p>One correct choice and multiple incorrect choices.</p>	<p>Incorrect choice.</p>

Problem 3a			Standard: MA.8.GR.2.3
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice: Rotation</p>			<p>Incorrect choice.</p> <p>Students who select <i>Reflection</i> may have confused reflection and rotation.</p>

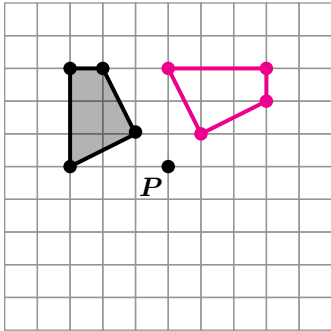
Problem 3b			Standard: MA.8.GR.2.3
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice:</p> <p>Reflection</p>			<p>Incorrect choice.</p> <p>Students who select <i>Rotation</i> may have confused reflection and rotation.</p>

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

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

Problem 4b			
Standards: MA.8.GR.2.3, MTR.5.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>(-2,3)</p>	<p>Response shows conceptual errors with minor errors.</p> <p>Students who write (-6,3) may have misunderstood which direction to translate.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write (-4,5) may have translated incorrectly.</p>	<p>Response shows limited understanding.</p>

Problem 4c			
Standards: MA.8.GR.2.3, MTR.5.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>(4, 3)</p>	<p>Response shows conceptual errors with minor errors.</p> <p>Students who write (4,-3) may have misunderstood that reflecting over the y-axis affects the x-value.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write (4,-3) may have thought that y-axis reflections affect the y-value.</p>	<p>Response shows limited understanding.</p>

Problem 5			
Standard: MA.8.GR.2.3			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> 	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>

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

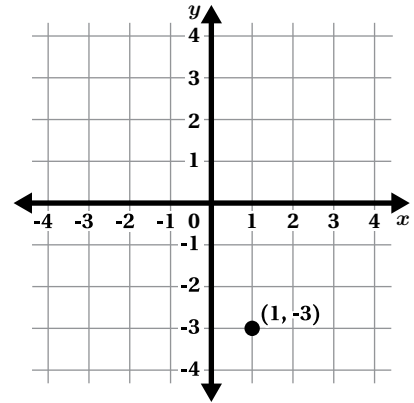
End-of-Unit Assessment

Unit 1

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

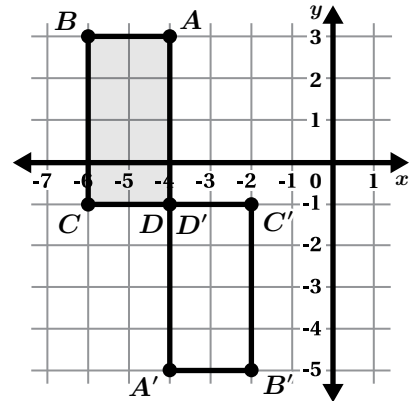
What are the coordinates of the image of this point after a reflection across the x -axis?

- 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?

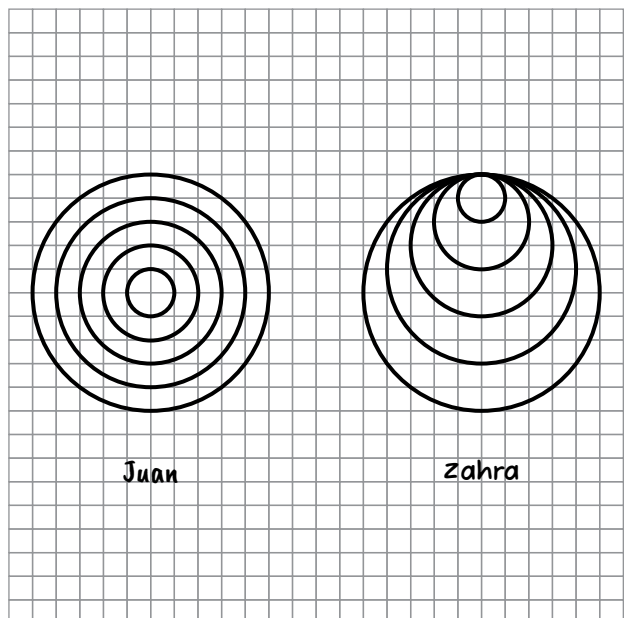
- A. A reflection over the x -axis.
- B. A reflection over the y -axis.
- C. A rotation of about the origin.
- D. A rotation of 180° about the origin.



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

Select *all* of the true statements.

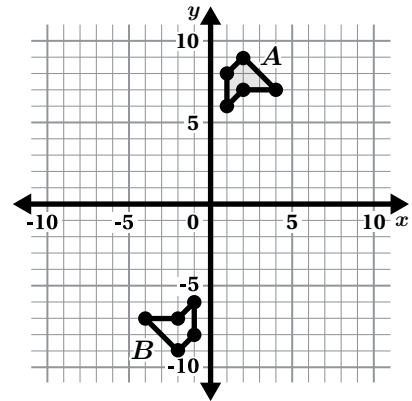
- A. The smallest circle in Juan's design is congruent to the smallest circle in Zahra's design.
- B. Juan's design is congruent to Zahra's design.
- C. If you translate Juan's design 14 units to the right, you get Zahra's design.
- D. Each circle in Juan's design has a congruent circle in Zahra's design.



End-of-Unit Assessment (continued)

Unit 1

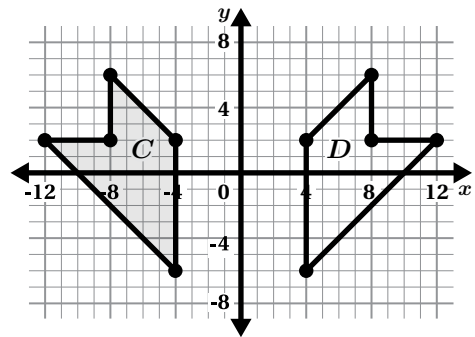
4. Use translations, rotations, or reflections to explain how you know polygon *A* is congruent to polygon *B*.



5. Here are two sets of figures.

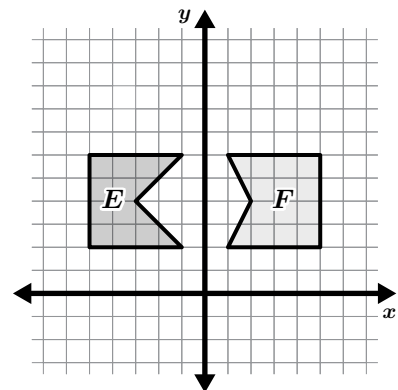
- a Is figure *C* congruent to figure *D*?

Explain your thinking.



- b Is figure *E* congruent to figure *F*?

Explain your thinking.

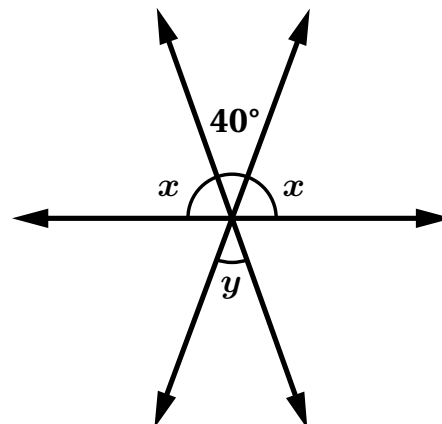


End-of-Unit Assessment (continued)

Unit 1

6. Here is a diagram.

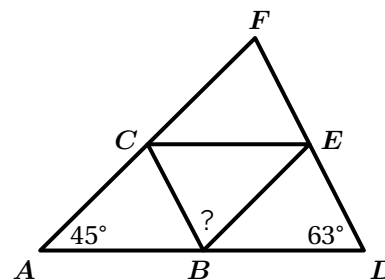
a Determine the values of x and y .



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	
<p>Correct choice:</p> <p>(1, 3)</p>			<p>Incorrect choice.</p> <p>Students who select (-1, -3) may have reflected over the y-axis instead of the x-axis.</p> <p>Students who select (3, -1) or (-3, 1) may have basic misunderstandings about reflections.</p>	

Problem 2				 Standard: MA.8.GR.2.3
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct choice:</p> <p>A rotation of 180° about the origin.</p>			<p>Incorrect choice.</p> <p>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.</p> <p>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.</p>	

Problem 3				Standard: MA.8.GR.2.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Both correct choices and no incorrect choices.</p> <ul style="list-style-type: none"> 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. 	<p>One correct choice and no incorrect choices.</p> <p>Both correct choices and one incorrect choice.</p>	<p>One correct choice and one incorrect choice.</p>	<p>Only incorrect choices.</p> <p>Two or more incorrect choices with some correct choices.</p>	

Problem 4				Standard: MA.8.GR.2.3
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct choice:</p> <p>Responses Vary. Polygon A is congruent to Polygon B because it can be mapped onto Polygon B using a 180° rotation around the origin.</p>	<p>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).</p>	<p>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.</p>	<p>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.</p>	

Problem 5a				Standard: MA.8.GR.2.3
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response and complete explanation.</p> <p>Yes. Explanations vary. I can reflect figure C along the y-axis onto figure D.</p>	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>	

Problem 5b				Standard: MA.8.GR.2.3
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response and complete explanation.</p> <p><i>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.</i></p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Explanation only states figure E is smaller than figure F.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>	

Problem 6a				Standard: MA.8.GR.1.4
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct choice:</p> <p><i>$x = 70$ degrees; $y = 40$ degrees</i></p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response includes an attempt but has a calculation error.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>	

Problem 6b				Standard: MA.8.GR.1.4
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct choice:</p> <p><i>$x + x + 40 = 180$ (or equivalent)</i></p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response includes an attempt but has a calculation error.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>	

Problem 7a				Standard: MA.8.GR.2.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response:</p> <p><i>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.</i></p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response only states side AB is congruent to sides CE and BD.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response states there are four congruent triangles.</p>	<p>Response shows limited understanding.</p>	

Problem 7b				Standard: MA.8.GR.2.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response:</p> <p><i>Responses vary.</i></p> <ul style="list-style-type: none"> • Triangle EFC • Triangle BCA • Triangle DEB 	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>	

Problem 7c				Standard: MA.8.GR.1.5
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response and complete explanation.</p> <p><i>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 $180 - 45 - 63 = 72$.</i></p>	<p>Correct response with minor flaws in explanation.</p> <p>Incorrect response with logical and complete explanation.</p> <p>E.g., Response includes correct explanation with an arithmetic error.</p>	<p>Correct response with incomplete explanation.</p> <p>E.g., Response includes 72° because the angles must add up to 180°.</p> <p>Incorrect response with explanation that shows partial understanding.</p> <p>E.g., Response recognizes some of the corresponding angles resulting from the transformations.</p>	<p>Incorrect response with no explanation.</p>	

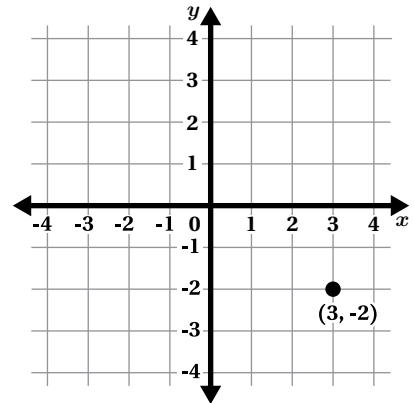
End-of-Unit Assessment

Unit 1

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

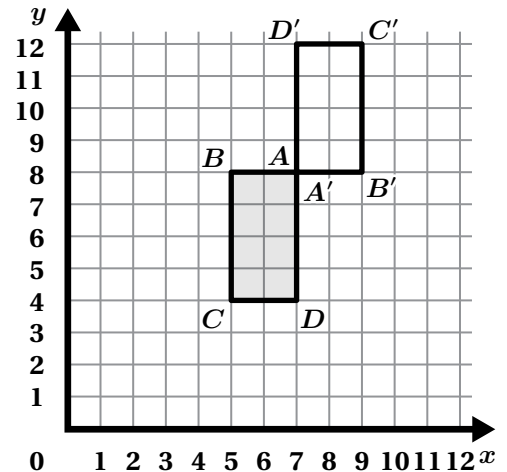
What are the coordinates of the image of this point after a reflection across the y -axis?

- 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?

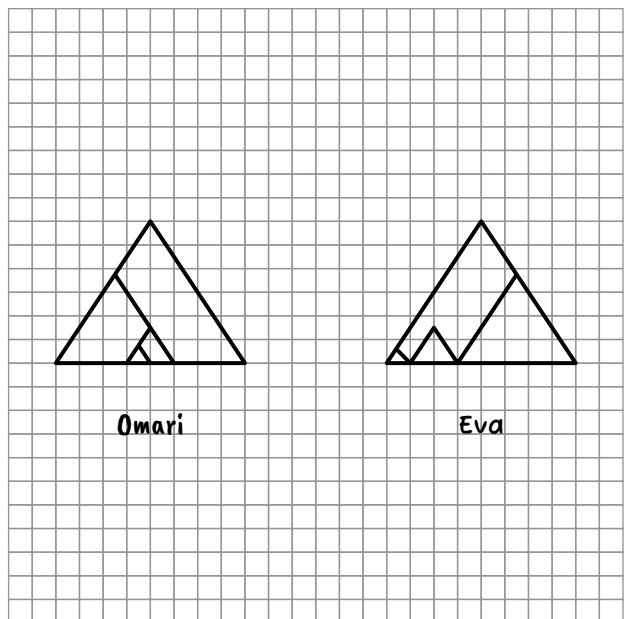
- A. A reflection over the x -axis.
- B. A reflection over the y -axis.
- C. A rotation of 90° about the origin.
- D. A rotation of 180° about the origin.



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

Select *all* of the true statements.

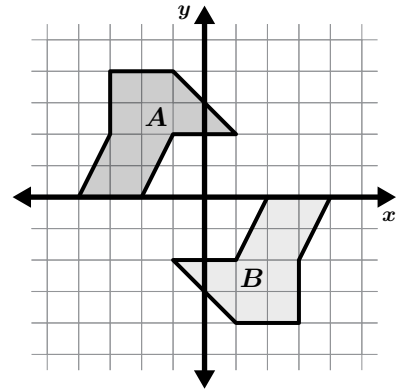
- A. The largest triangle in Omari's design is congruent to the largest triangle in Eva's design.
- B. Each triangle in Omari's design has a congruent triangle in Eva's design.
- C. If you translate Omari's design 10 units to the right, you get Eva's design.
- D. Omari's design is congruent to Eva's design.



End-of-Unit Assessment (continued)

Unit 1

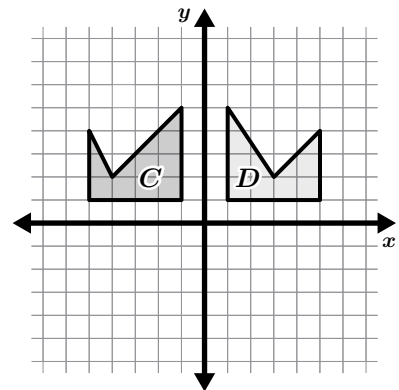
4. Use translations, rotations, or reflections to explain how you know polygon *A* is congruent to polygon *B*.



5. Here are two sets of figures.

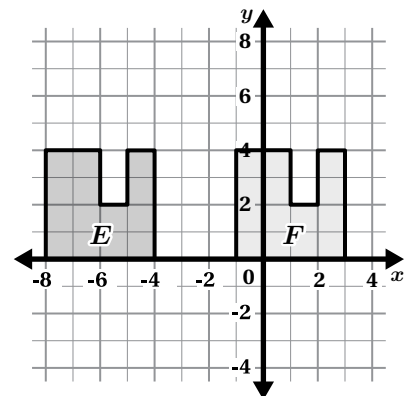
- a Is figure *C* congruent to figure *D*?

Explain your thinking.



- b Is figure *E* congruent to figure *F*?

Explain your thinking.



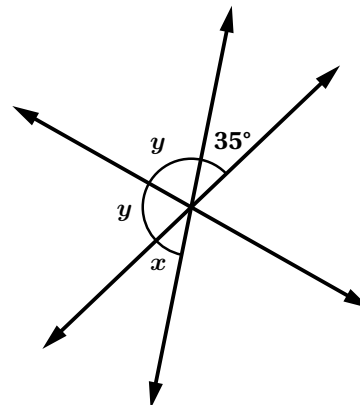
End-of-Unit Assessment (continued)

Unit 1

6. Here is a diagram.

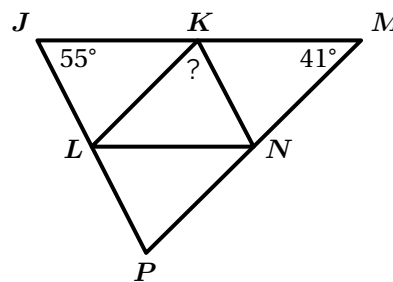
- a Determine the values of x and y .

- b 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	
<p>Correct choice:</p> <p>(-3, -2)</p>			<p>Incorrect choice.</p> <p>Students who select (3, 2) may have reflected over the x-axis instead of the y-axis.</p> <p>Students who select (-2, -3) or (2, -3) may have basic misunderstandings about reflections.</p>	

Problem 2				 Standard: MA.8.GR.2.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct choice:</p> <p>A rotation of 180° about the origin.</p>			<p>Incorrect choice.</p> <p>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.</p> <p>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.</p>	

Problem 3				Standard: MA.8.GR.2.3
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Both correct choices and no incorrect choices.</p> <ul style="list-style-type: none"> • 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. 	<p>One correct choice and no incorrect choices.</p> <p>Both correct choices and one incorrect choice.</p>	<p>One correct choice and one incorrect choice.</p>	<p>Only incorrect choices.</p> <p>Two or more incorrect choices with some correct choices.</p>	

Problem 4				Standard: MA.8.GR.2.3
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response:</p> <p>Responses vary. If polygon A is rotated 180° counterclockwise about the origin, it matches up perfectly with polygon B.</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response includes a translation and/or rotation, but not specifics (translate left, then rotate).</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response includes incorrect transformations (it was translated and then it was reflected).</p>	<p>Response shows limited understanding.</p> <p>E.g., Response does not include any transformations (they are congruent because they have the same shape).</p>	

Problem 5a				Standard: MA.8.GR.2.3
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response and complete explanation.</p> <p>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.</p>	<p>Correct response with minor flaws in explanation.</p> <p>Incorrect response with logical and complete explanation.</p> <p>E.g., Response includes a sequence of transformations that takes one figure onto the other.</p>	<p>Correct response with incomplete explanation.</p> <p>E.g., Explanation only states the figures are different.</p> <p>Incorrect response with explanation that shows partial understanding.</p> <p>E.g., Response includes “They’re the same shape.”</p>	<p>Incorrect response with no explanation.</p>	

Problem 5b				Standard: MA.8.GR.2.3
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response and complete explanation.</p> <p><i>Yes. Explanations vary. Figure E is congruent to figure F. I can translate figure E 7 units right onto figure F.</i></p>	<p>Correct response with minor flaws in explanation.</p> <p>E.g., Response references transformations without a specific description. "I can move one onto the other."</p> <p>Incorrect response with logical and complete explanation.</p> <p>E.g., "If you rotate and then translate figure E, it will not match up with figure D."</p>	<p>Correct response with incomplete explanation.</p> <p>E.g., Response does not reference the definition of congruence. "They are the same."</p> <p>Incorrect response with explanation that shows partial understanding.</p>	<p>Incorrect response with no explanation.</p>	

Problem 6a				Standard: MA.8.GR.1.4
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct choice:</p> <p><i>$x = 35$ degrees; $y = 52.5$ degrees</i></p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response includes an attempt but has a calculation error.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>	

Problem 6b				Standard: MA.8.GR.1.4
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct choice:</p> <p><i>$x + y + y = 180$ or $35 + y + y = 180$ (or equivalent)</i></p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response includes an attempt but has a calculation error.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>	

Problem 7a				Standard: MA.8.GR.2.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response:</p> <p>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.</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response only states side JK is congruent to sides LN and KM.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response states there are four congruent triangles.</p>	<p>Response shows limited understanding.</p>	

Problem 7b				Standard: MA.8.GR.2.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response:</p> <p>Responses vary.</p> <ul style="list-style-type: none"> • Triangle NPL • Triangle KLJ • Triangle MNK 	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>	

Problem 7c				Standard: MA.8.GR.1.4
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response and complete explanation.</p> <p>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 $180 - 55 - 41 = 84$.</p>	<p>Correct response with minor flaws in explanation.</p> <p>Incorrect response with logical and complete explanation.</p> <p>E.g., Response includes correct explanation with an arithmetic error.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response includes 84° because the angles must add up to 180°.</p>	<p>Incorrect response with no explanation.</p>	

Unit 1

**Show What You
Know PDFs**

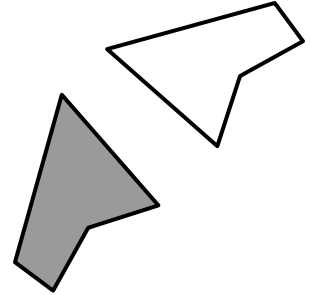
Show What You Know



1.01

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

- A. Reflection
- B. Rotation
- C. Translation



Explain your thinking.

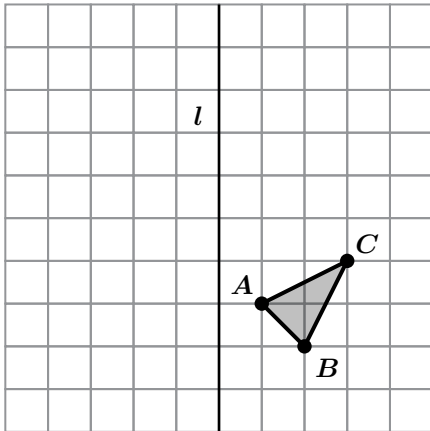
Show What You Know



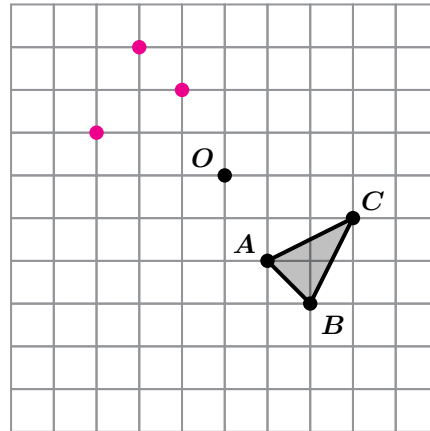
1.02

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 .



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?

- A. Reflection over the x -axis
- B. Reflection over the y -axis
- C. Translation 4 units down
- D. None of the above

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

Explain your thinking.

Show What You Know

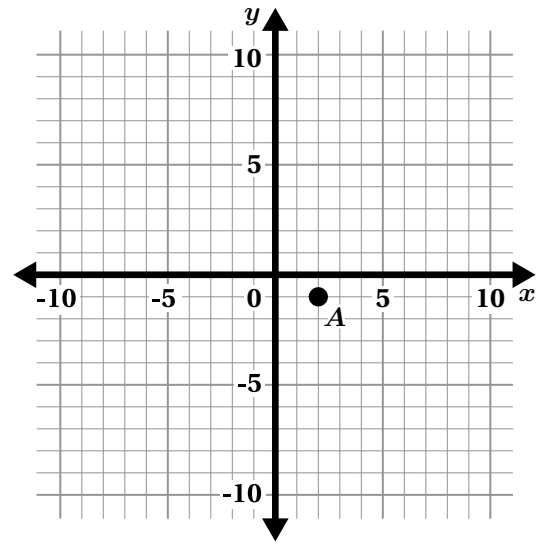


1.04

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 $(0, 0)$	



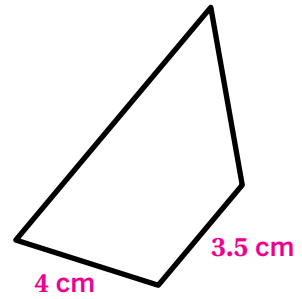
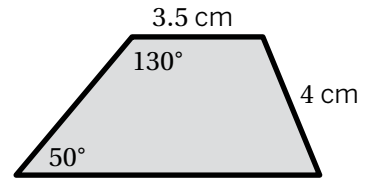
Show What You Know



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).



Show What You Know



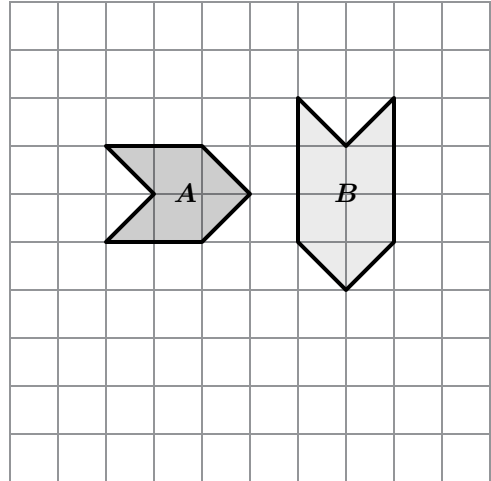
1.06

Are figures *A* and *B* congruent? Circle one.

Yes

No

Explain your thinking.



Show What You Know



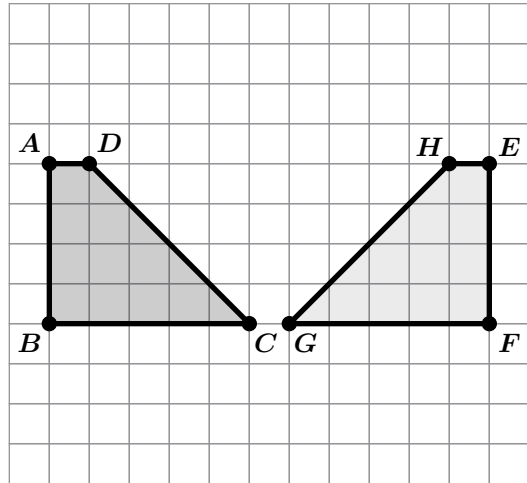
1.07

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

Yes

No

Explain your thinking.



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°

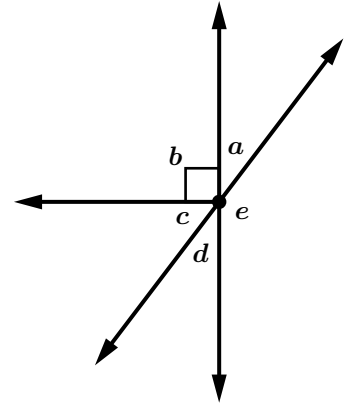
Explain your reasoning.

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:

$m\angle a = \dots\dots\dots$

$m\angle b = \dots\dots\dots$

$m\angle d = \dots\dots\dots$

$m\angle e = \dots\dots\dots$

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 $16 \times 180^\circ$. Is he correct or incorrect? Explain or show your thinking. If he is incorrect, determine the correct sum.

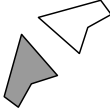
Show What You Know Lesson 1

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.

Grade 8 33 © Amplify Education, Inc. and its licensors. Amplify Distance Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

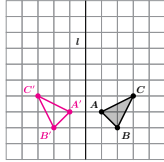
Show What You Know Lesson 2

Name: _____ Date: _____ Period: _____

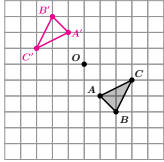
Show What You Know 1.02

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 .



Grade 8 34 © Amplify Education, Inc. and its licensors. Amplify Distance Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

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.

Grade 8 35 © Amplify Education, Inc. and its licensors. Amplify Distance Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

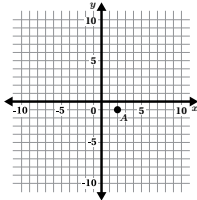
Show What You Know Lesson 4

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 $(0, 0)$	$(-2, 1)$



Grade 8 36 © Amplify Education, Inc. and its licensors. Amplify Distance Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

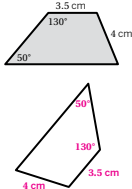
Show What You Know Lesson 5

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).



Grade 8 **37** © Amplify Education, Inc. and its licensors. Amplify Geometry Math is based on work from Illustrative Mathematics (IM) and Open Up Resources.

Show What You Know Lesson 6

Name: _____ Date: _____ Period: _____

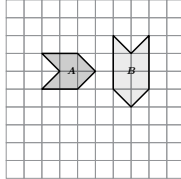
Show What You Know  **1.06**

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.



Grade 8 **38** © Amplify Education, Inc. and its licensors. Amplify Geometry Math is based on work from Illustrative Mathematics (IM) and Open Up Resources.

Show What You Know Lesson 7

Name: _____ Date: _____ Period: _____

Show What You Know  **1.07**

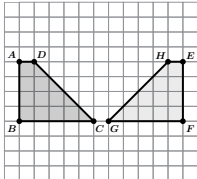
Is figure *ABCD* congruent to figure *EFGH*? Circle one.

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.



Grade 8 **39** © Amplify Education, Inc. and its licensors. Amplify Geometry Math is based on work from Illustrative Mathematics (IM) and Open Up Resources.

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.

Grade 8 **40** © Amplify Education, Inc. and its licensors. Amplify Geometry Math is based on work from Illustrative Mathematics (IM) and Open Up Resources.

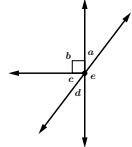
Show What You Know Lesson 9

Name: _____ Date: _____ Period: _____

Show What You Know  1.09

1. Using the figure shown,

- Name a pair of complementary angles.
Angles c and d
- Name a pair of vertical angles.
Angles a and d
- Name a pair of supplementary angles.
Angles a and c



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

$m\angle a = m\angle b = 40^\circ$

$m\angle b = m\angle d = 90^\circ$


$m\angle d = m\angle c = 40^\circ$

$m\angle e = m\angle c = 140^\circ$

Grade 8 41 © Amplify Education, Inc. and its licensors. Amplify Geometry Math is based on materials from Illustrative Mathematics (IM) and Open Up Resources.

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 $16 \times 180^\circ$. 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 $(16 - 2) \times 180^\circ$ or $14 \times 180^\circ$ to get the sum of the interior angle measures of a 16-gon. The result is 2520°.

Grade 8 42 © Amplify Education, Inc. and its licensors. Amplify Geometry Math is based on materials from Illustrative Mathematics (IM) and Open Up Resources.

Unit 2

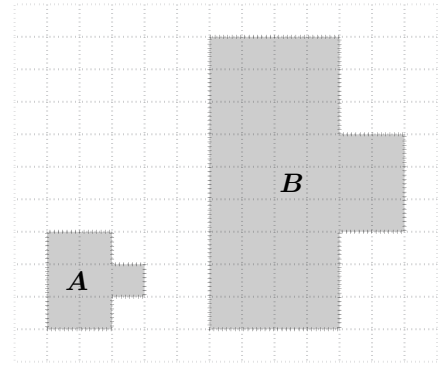
Assessments and Rubrics

Pre-Unit Check

Unit 2

1. Is figure B a scaled copy of figure A ?

Explain your thinking.



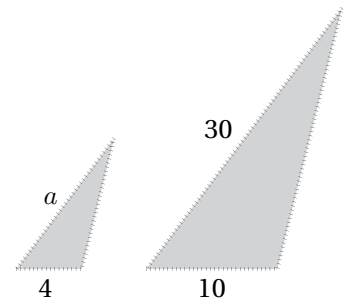
2. x and y are in a proportional relationship. Complete the table.

x	y
4	16
3	
	8

3. These triangles are scaled copies of each other.

a. What is the scale factor?

b. What is the value of a ?



Pre-Unit Check (continued)

Unit 2

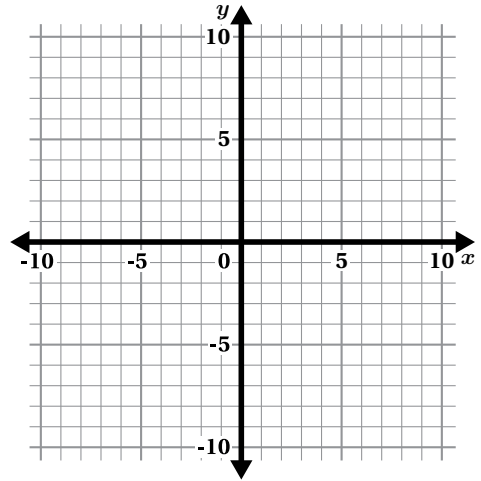
4. Use the coordinate plane if it helps with your thinking.

- a** Point A has coordinates $(-1, -4)$.

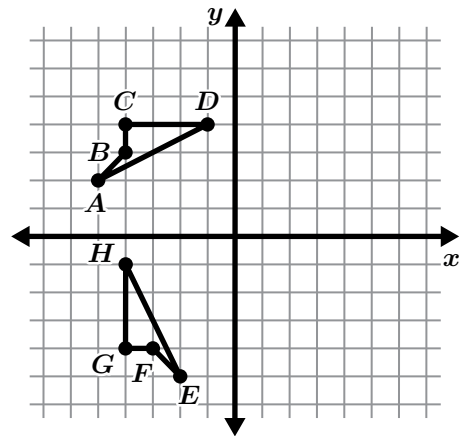
What are the coordinates of the image of point A after a translation 3 units down?

- b** Point B has coordinates $(-3, 2)$.

What are the coordinates of the image of point B after a reflection over the y -axis?

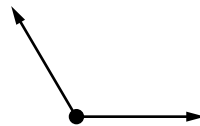


5. Describe a single transformation to show that polygon $ABCD$ is congruent to polygon $EFGH$.



6. Let's consider angle measures.

- a** Which could be the measure of this angle?



- A. 30°
- B. 90°
- C. 120°
- D. 180°

- b** Which set of angle measures could be in the same triangle?

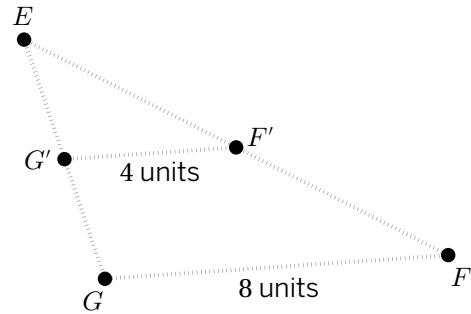
- A. $90^\circ, 50^\circ, 40^\circ$
- B. $90^\circ, 45^\circ, 30^\circ$
- C. $50^\circ, 40^\circ, 30^\circ$
- D. $120^\circ, 90^\circ, 30^\circ$

Sub-Unit Quiz

Unit 2

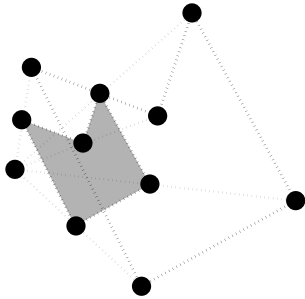
1. Which dilation moves triangle GEF onto triangle $G'EF'$?

- 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: $\frac{1}{2}$

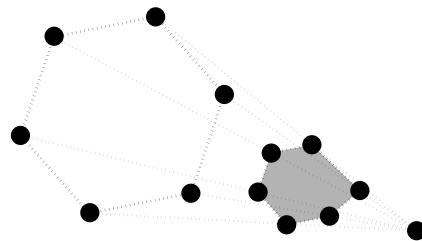


2. Select *all* of the pairs of polygons where the image appears to be the result of a dilation of the pre-image.

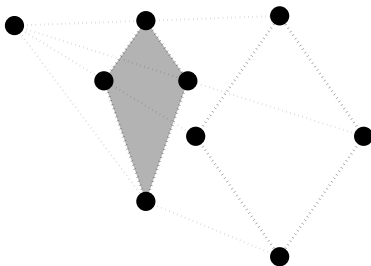
A. Pair 1



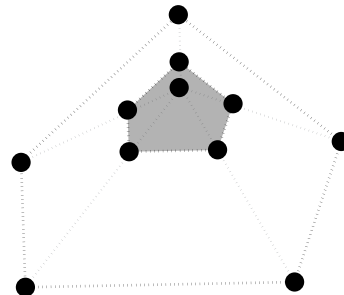
B. Pair 2



C. Pair 3



D. Pair 4

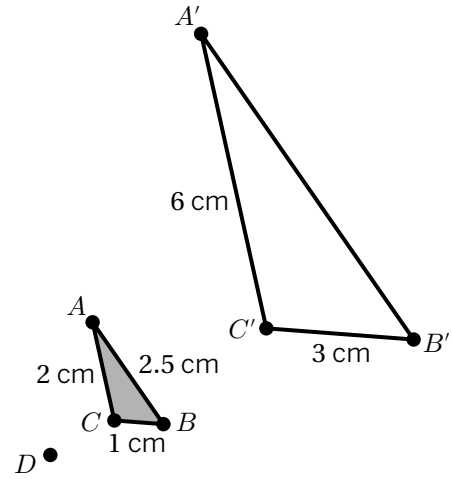


Sub-Unit Quiz (continued)

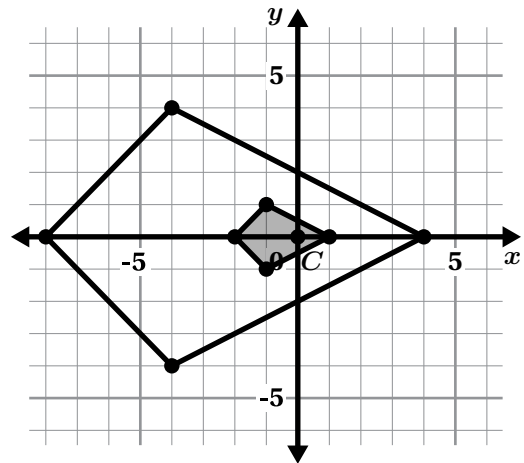
Unit 2

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.

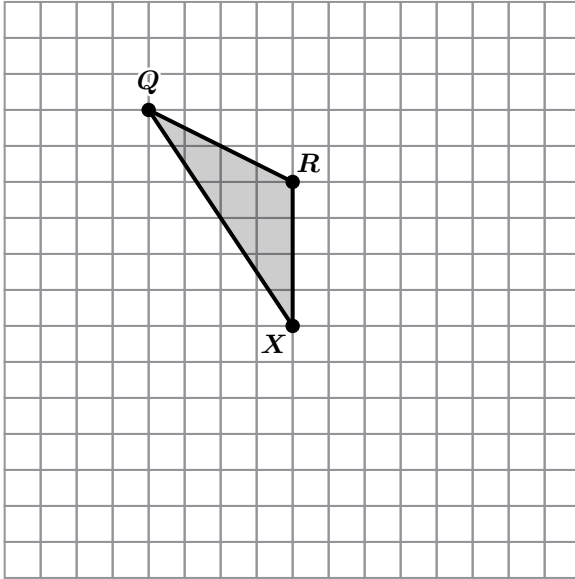


Sub-Unit Quiz (continued)

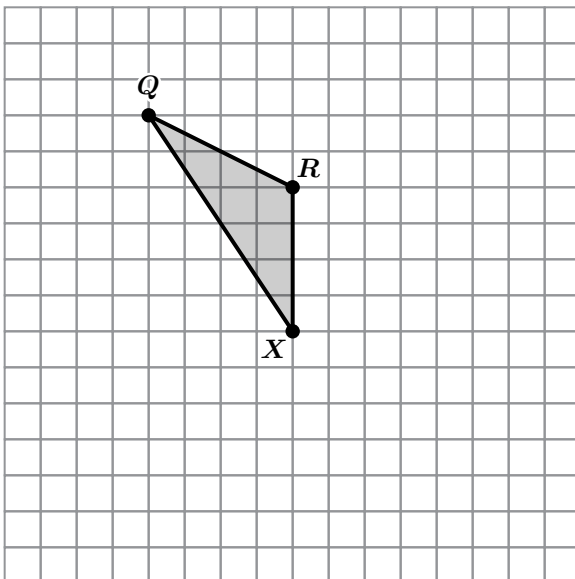
Unit 2


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
<p>Correct choice:</p> <p>Center of dilation: point <i>E</i></p> <p>Scale factor: $\frac{1}{2}$</p>			<p>Incorrect choice.</p> <p>Students who select <i>Center of dilation: point E, Scale factor: 2</i> may have confused the image and pre-image.</p>

Problem 2			 Standard: MA.8.GR.2.2
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Both correct choices and no incorrect choices.</p> <ul style="list-style-type: none"> • Pair 1 • Pair 4 	<p>One correct choice and no incorrect choices.</p> <p>Both correct choices and one incorrect choice.</p>	<p>One correct choice and one incorrect choice.</p>	<p>Only incorrect choices.</p> <p>Two or more incorrect choices with some correct choices.</p>

Problem 3a			 Standard: MA.8.GR.2.2
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>3</p>		<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Incorrect scale factor that is larger than 1.</p>	<p>Response shows limited understanding.</p>

Problem 3b			 Standard: MA.8.GR.2.2
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>A'B': 7.5 centimeters</p>	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>

Problem 4		Standard: MA.8.GR.2.3	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p><i>Responses vary. The smaller figure is dilated using point C at the origin as the center of dilation with a scale factor of 4.</i></p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response mentions the correct center of dilation or scale factor, but not both, or references a scale factor of $\frac{1}{4}$.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response includes an incorrect scale factor, such as 2.</p>	<p>Response shows limited understanding.</p>

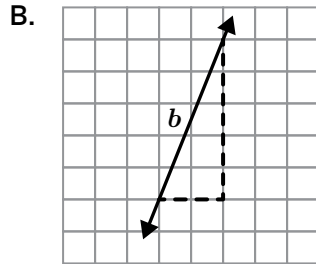
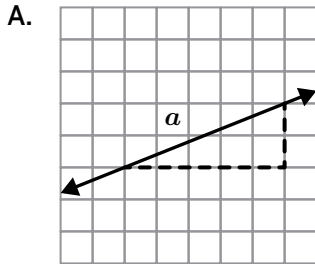
Problem 5a		Standard: MA.8.GR.2.3	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response shows correct dilation with a scale factor of 2 but does not use point Q as the center of dilation.</p> <p>E.g., Response includes a minor error dilating one of the points.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response uses point Q as the center of dilation, but with an incorrectly applied scale factor.</p> <p>E.g., Response includes minor errors dilating two or three of the points.</p>	<p>Response shows limited understanding.</p>

Problem 5b		Standard: MA.8.GR.2.3	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response shows correct dilation with a scale factor of $\frac{1}{4}$ but does not use R as the center of dilation.</p> <p>E.g., Response includes a minor error translating one of the points.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response uses point R as the center of dilation, but with an incorrectly applied scale factor.</p> <p>E.g., Response includes minor errors translating two or three of the points.</p>	<p>Response shows limited understanding.</p>

End-of-Unit Assessment

Unit 2

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



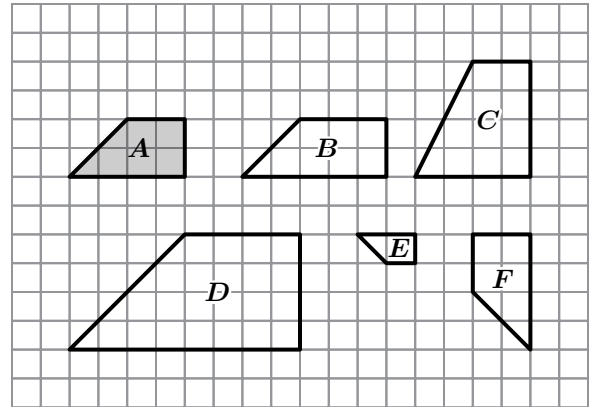
C. Both D. Neither

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.

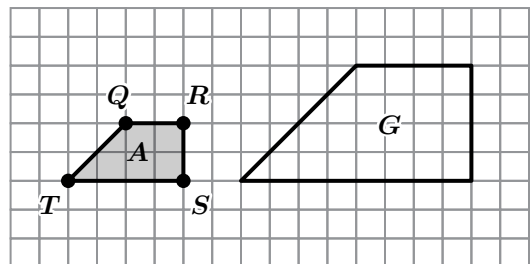
3. Here are several polygons.

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



- b Polygon G is similar to polygon A.

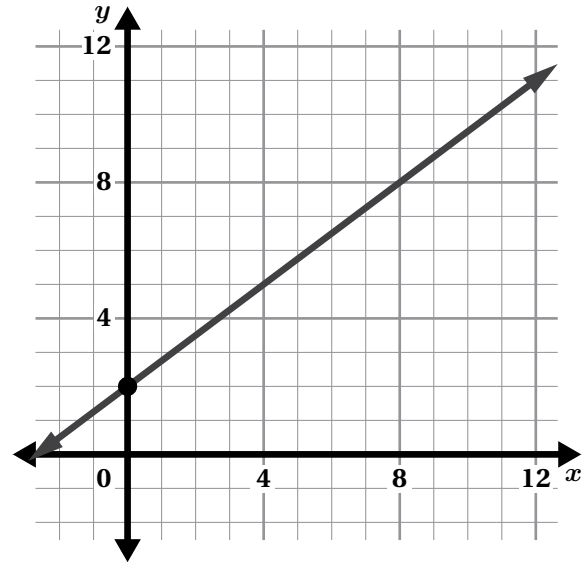
Describe a sequence of transformations that moves polygon A to polygon G.



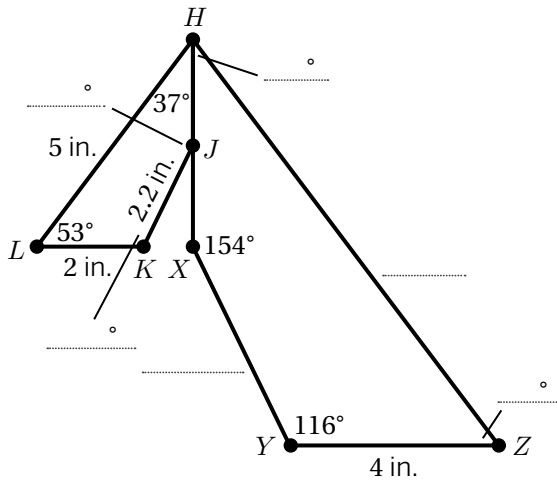
End-of-Unit Assessment (continued)

Unit 2

4. What is the slope of this line?



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



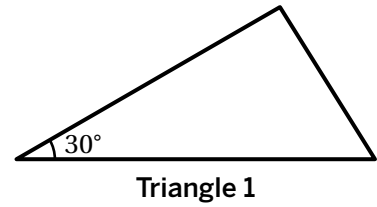
- a Label the missing side and angle measurements in both figures.
- b Precisely describe a sequence of transformations to show that figure $HJKL$ is similar to figure $HXYZ$.

End-of-Unit Assessment (continued)

Unit 2

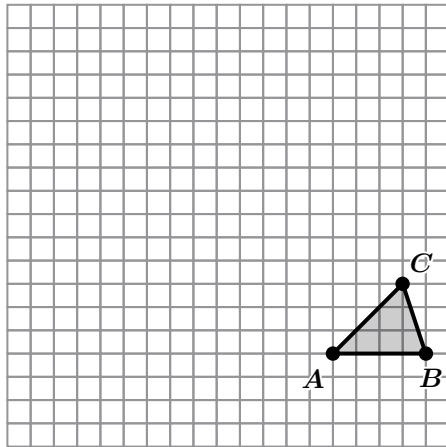
6. Here is Triangle 1. Triangle 2 also has a 30° angle.

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

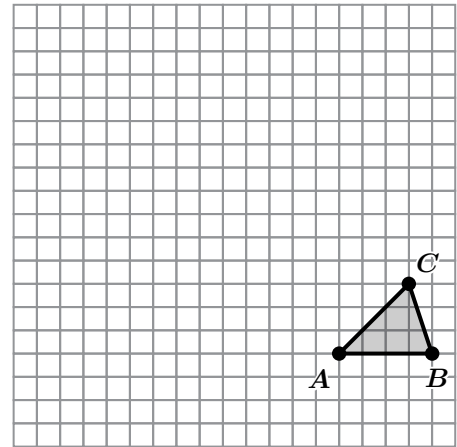


7. Here is triangle ABC .

- 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.

Standard	MA.8.GR.2.2	MA.8.GR.2.3	MA.8.GR.2.4	MA.8.AR.3.2
Problem(s)	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
<p>Correct choice:</p> 			<p>Incorrect choice.</p> <p>Students who select line a may have counted the change in x first.</p> <p>Students who select <i>Both</i> may have noticed that each slope triangle has sides with lengths 5 units and 2 units.</p>

Problem 2			
Standard: MA.8.GR.2.2			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice:</p> <p>Dilations of a triangle keep angle measures the same.</p>			<p>Incorrect choice.</p> <p>Students who select <i>The image of a triangle after a dilation is congruent to the pre-image</i> may have confused the word <i>congruent</i> with <i>similar</i>.</p> <p>Students who select <i>Dilations of a triangle keep side lengths the same</i> may have confused sides and angles.</p>

Problem 3a			
Standards: MA.8.GR.2.2, MTR.5.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>All correct choices and no incorrect choices.</p> <ul style="list-style-type: none"> • Polygon <i>D</i> • Polygon <i>E</i> • Polygon <i>F</i> 	<p>One or two correct choices and no incorrect choices.</p> <p>All correct choices and one incorrect choice.</p> <p>Students who do not say polygon <i>F</i> is similar may not recognize that congruent polygons are similar.</p>	<p>One or two correct choices and one incorrect choice.</p>	<p>Only incorrect choices.</p> <p>Two or more incorrect choices with some correct choices.</p>

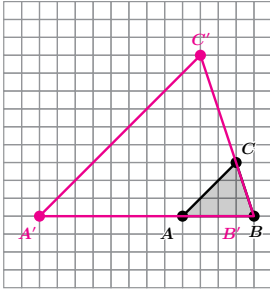
Problem 3b			
Standard: MA.8.GR.2.2			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p><i>Responses vary.</i> Translate polygon <i>A</i> 10 units right, then dilate polygon <i>A</i> using point <i>S</i> as the center of dilation and a scale factor of 2.</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response correctly describes a sequence of transformations but the description of transformations is imprecise, such as, "Dilate polygon <i>A</i>, then translate it to polygon <i>G</i>."</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response incorrectly describes a sequence of transformations, such as, "Dilate polygon <i>A</i> using a scale factor of $\frac{1}{2}$."</p>	<p>Response shows limited understanding.</p> <p>E.g., Response does not mention any transformations, such as, "Polygon <i>G</i> is the same as polygon <i>A</i>, just a little bit bigger."</p>

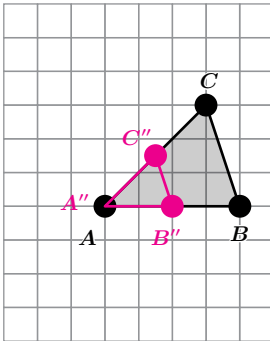
Problem 4			
Standard: MA.8.AR.3.2			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>$\frac{3}{4}$</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response states the slope is $\frac{4}{3}$.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>

Problem 5a				Standard: MA.8.GR.2.2
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct responses:</p> <ul style="list-style-type: none"> • $m\angle J$: 154° • $m\angle K$: 116° • XY: 4.4 inches • HZ: 10 inches • $m\angle XHZ$: 37° • $m\angle Z$: 53° 	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response includes four or five of the correct measurements.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response includes that the angles in figure $HXYZ$ are double the measure of the corresponding angles in figure $HJKL$.</p>	<p>Response shows limited understanding.</p>	

Problem 5b				Standard: MA.8.GR.2.3
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response:</p> <p><i>Responses vary. Reflect polygon $HJKL$ over line HJ, then dilate using a scale factor of 2 and point H as the center of dilation.</i></p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response includes a correct description but does not specify either the center of the dilation or the scale factor.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response describes a reflection or a dilation, but not both.</p>	<p>Response shows limited understanding.</p>	

Problem 6				Standards: MA.8.GR.2.4, MTR.4.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response:</p> <p><i>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.</i></p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response includes a minor error in discussing possible angle measurements.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response includes that one pair of congruent corresponding angles is sufficient for similarity.</p>	<p>Response shows limited understanding.</p> <p>E.g., Response does not mention any angle relationships.</p>	

Problem 7a		Standard: MA.8.GR.2.3	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> 	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response includes a correct dilation with a scale factor of 3 but does not use point <i>B</i> as the center of dilation.</p> <p>E.g., Response includes a minor error dilating one of the points.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response uses point <i>B</i> as the center of dilation, but with an incorrectly applied scale factor.</p> <p>E.g., Response includes minor errors dilating two or three of the points.</p>	<p>Response shows limited understanding.</p>

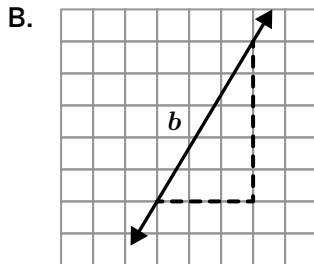
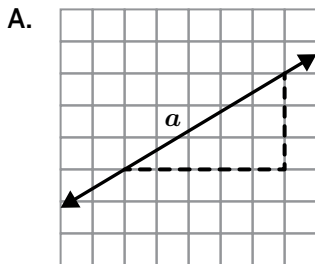
Problem 7b		Standard: MA.8.GR.2.3	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> 	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response includes a correct dilation with a scale factor of $\frac{1}{2}$ but does not use point <i>A</i> as the center of dilation.</p> <p>E.g., Response includes a minor error dilating one of the points.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response uses point <i>A</i> as the center of dilation, but with an incorrectly applied scale factor.</p> <p>E.g., Response includes minor errors dilating two or three of the points.</p>	<p>Response shows limited understanding.</p>

Problem 7c		Standard: MA.8.GR.2.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p><i>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 $A''B''C''$.</i></p>	<p>Response shows conceptual understanding with minor errors.</p> <p>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.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response includes dilations but is not clear.</p>	<p>Response shows limited understanding.</p>

End-of-Unit Assessment

Unit 2

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



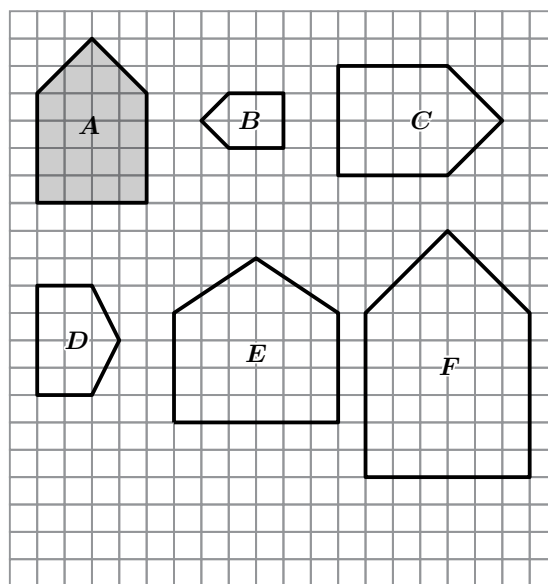
C. Both D. Neither

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.

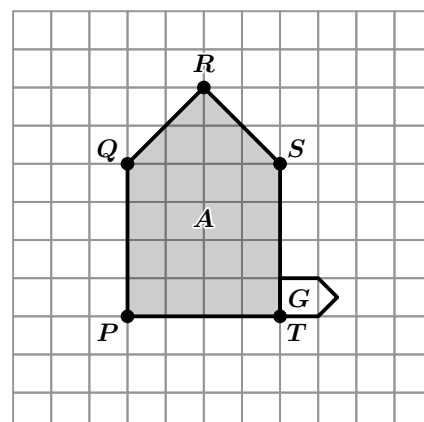
3. Here are several polygons.

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



- b Polygon G is similar to polygon A.

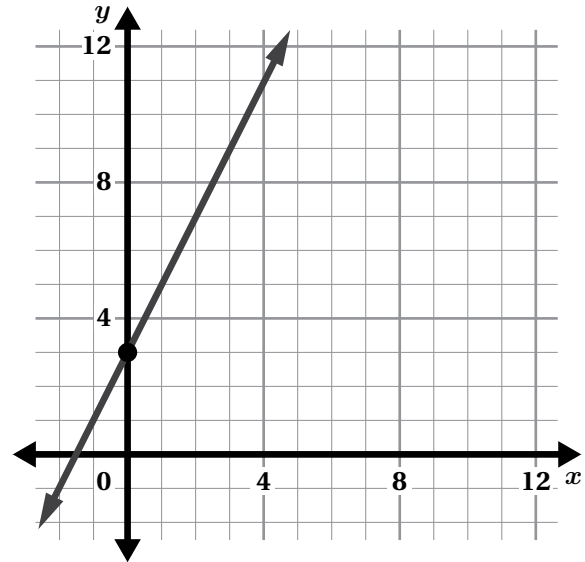
Describe a sequence of transformations that moves polygon A to polygon G.



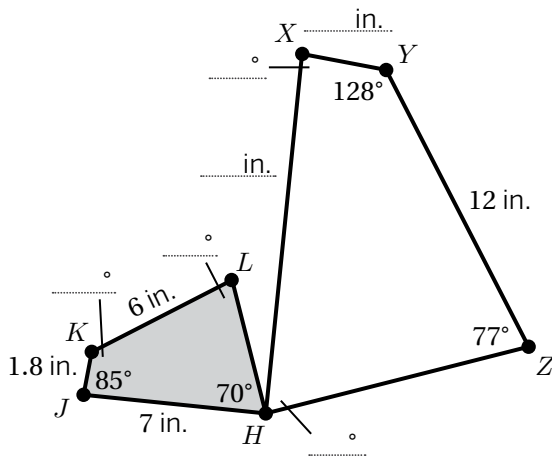
End-of-Unit Assessment (continued)

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 two 25° angles.

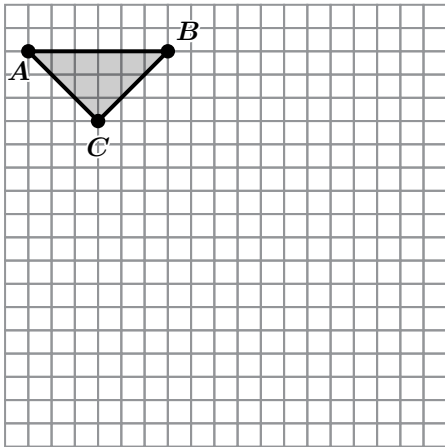
Explain or show why Triangle 1 and Triangle 2 must be similar.

Triangle 1

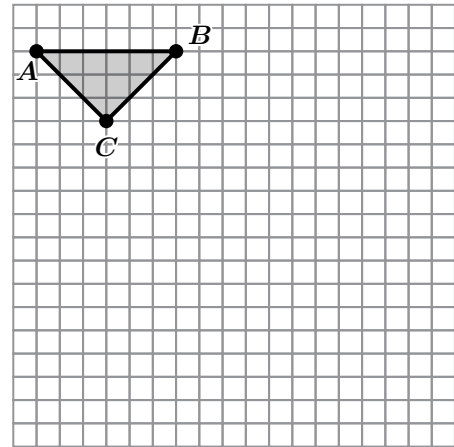


7. Here is triangle *ABC*.

- 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.

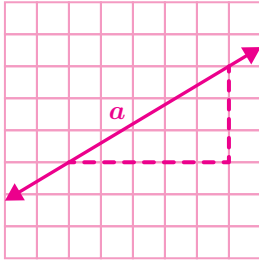


- b Draw triangle *A''B''C''*, the image of triangle *ABC*, after a dilation using point *C* as the center of dilation and a scale factor of $\frac{1}{3}$.



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

Standard	MA.8.GR.2.2	MA.8.GR.2.3	MA.8.GR.2.4	MA.8.AR.3.2
Problem(s)	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
<p>Correct choice:</p> 			<p>Incorrect choice.</p> <p>Students who select line b may have counted the change in x first.</p> <p>Students who select <i>Both</i> may have noticed that each slope triangle has sides with lengths 3 units and 5 units.</p>

Problem 2			
Standard: MA.8.GR.2.2			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice:</p> <p>Dilations always keep side lengths the same.</p>			<p>Incorrect choice.</p> <p>Students who select <i>The image of a line after a dilation is always parallel to the original line</i> may have confused the word <i>parallel</i> with <i>perpendicular</i>.</p> <p>Students who select <i>Dilations always keep angle measures the same</i> may have confused sides and angles.</p>

Problem 3a			
Standards: MA.8.GR.2.2, MTR.5.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>All correct choices and no incorrect choices.</p> <ul style="list-style-type: none"> • Polygon <i>B</i> • Polygon <i>C</i> • Polygon <i>F</i> 	<p>One or two correct choices and no incorrect choices.</p> <p>All correct choices and one incorrect choice.</p> <p>Students who do not say polygon <i>C</i> is similar may not recognize that congruent polygons are similar.</p>	<p>One or two correct choices and one incorrect choice.</p>	<p>Only incorrect choices.</p> <p>Two or more incorrect choices with some correct choices.</p>

Problem 3b			
Standard: MA.8.GR.2.2			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>Responses vary. Rotate polygon <i>A</i> 90° clockwise around point <i>T</i>, then dilate polygon using a scale factor of $\frac{1}{4}$ and point <i>T</i> as the center of dilation.</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response correctly describes a sequence of transformations but the description of transformations is imprecise, such as, "Rotate polygon <i>A</i>, then dilate it."</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response incorrectly describes a sequence of transformations, such as, "Dilate polygon <i>A</i> with a scale factor of $\frac{1}{4}$," or, "Rotate polygon <i>A</i>."</p>	<p>Response shows limited understanding.</p> <p>E.g., Response does not mention any transformations, such as, "Polygon <i>G</i> is the same as polygon <i>A</i>, just a little bit smaller."</p>

Problem 4			
Standard: MA.8.AR.3.2			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>2</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response states the slope is $\frac{1}{2}$.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>

Problem 5a				Standard: MA.8.GR.2.2
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct responses:</p> <ul style="list-style-type: none"> • $m\angle K$: 128° • $m\angle L$: 77° • XY: 3.6 inches • HX: 14 inches • $m\angle X$: 85° • $m\angle ZHX$: 70° 	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response includes four or five of the correct measurements.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response includes that the angles in figure $HXYZ$ are double the measure of the corresponding angles in figure $HJKL$.</p>	<p>Response shows limited understanding.</p>	

Problem 5b				Standard: MA.8.GR.2.3
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response:</p> <p>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.</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response includes a correct description but does not specify either the center of the dilation or the scale factor.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response describes a rotation or a dilation, but not both.</p>	<p>Response shows limited understanding.</p>	

Problem 6				Standards: MA.8.GR.2.4, MTR.4.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response:</p> <p>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°.</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response includes a minor error in discussing possible angle measurements.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response includes that one pair of congruent corresponding angles is sufficient for similarity.</p>	<p>Response shows limited understanding.</p> <p>E.g., Response does not mention any angle relationships.</p>	

Problem 7a		Standards: MA.8.GR.2.3, MTR.5.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response includes a correct dilation with a scale factor of 2 but does not use point <i>A</i> as the center of dilation.</p> <p>E.g., Response includes a minor error dilating one of the points.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response uses point <i>A</i> as the center of dilation, but with an incorrectly applied scale factor.</p> <p>E.g., Response includes minor errors dilating two or three of the points.</p>	<p>Response shows limited understanding.</p>

Problem 7b		Standards: MA.8.GR.2.3, MTR.4.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response includes a correct dilation with a scale factor of $\frac{1}{3}$ but does not use point <i>C</i> as the center of dilation.</p> <p>E.g., Response includes a minor error dilating one of the points.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response uses point <i>C</i> as the center of dilation, but with an incorrectly applied scale factor.</p> <p>E.g., Response includes minor errors dilating two or three of the points.</p>	<p>Response shows limited understanding.</p>

Problem 7c				Standards: MA.8.GR.2.2, MTR.5.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response:</p> <p><i>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 $A''B''C''$.</i></p>	<p>Response shows conceptual understanding with minor errors.</p> <p>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.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response includes dilations but is not clear.</p>	<p>Response shows limited understanding.</p>	

Unit 2

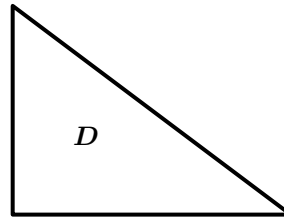
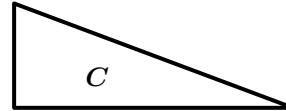
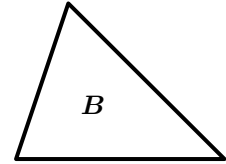
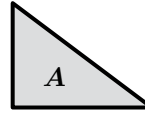
**Show What You
Know PDFs**

Show What You Know



2.01

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



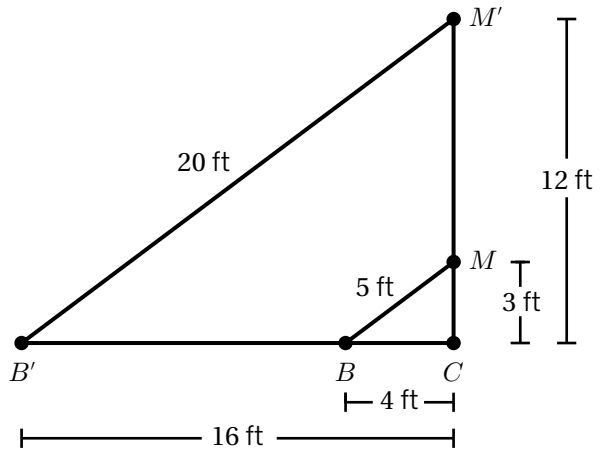
Show What You Know



2.02

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

What is the scale factor? Explain your thinking.

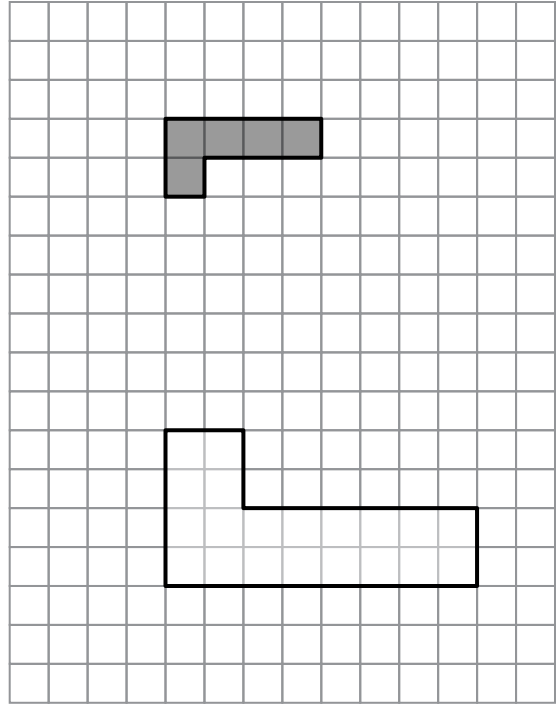


Show What You Know



2.03

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

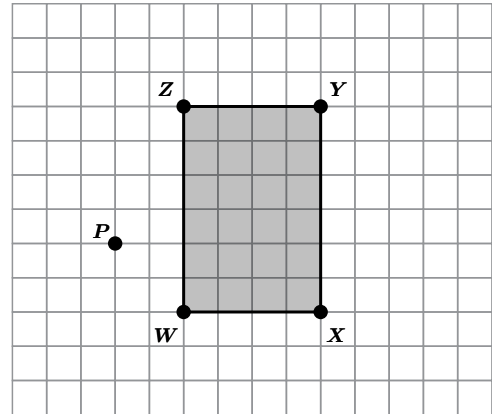


Show What You Know



2.04

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



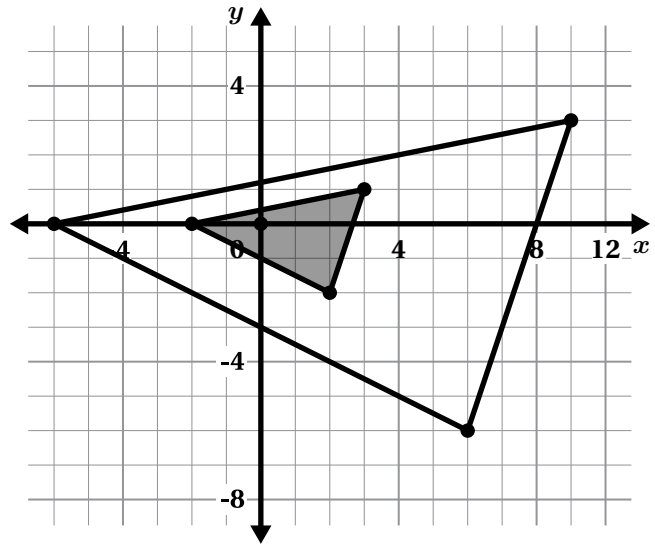
Show What You Know



2.05

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.



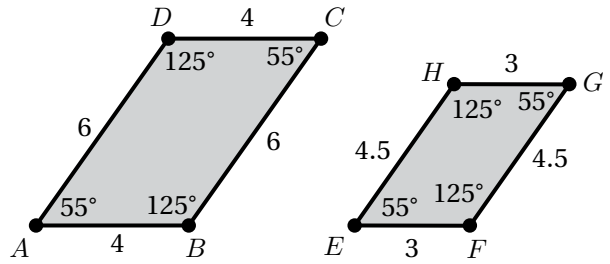
Show What You Know



2.06

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

Explain your thinking.



Show What You Know

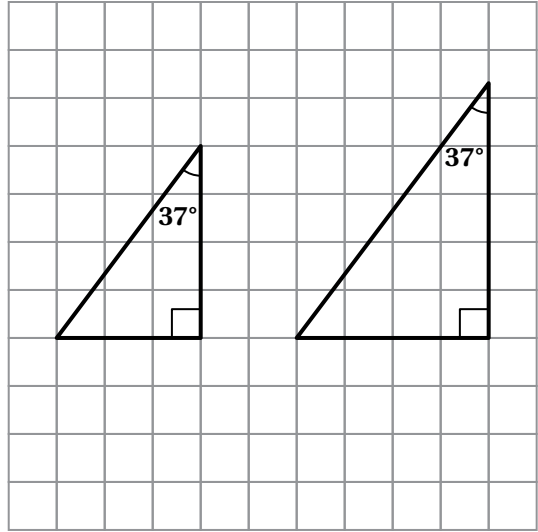


2.07

Are these triangles similar? Circle one.

Yes No

Explain your thinking.



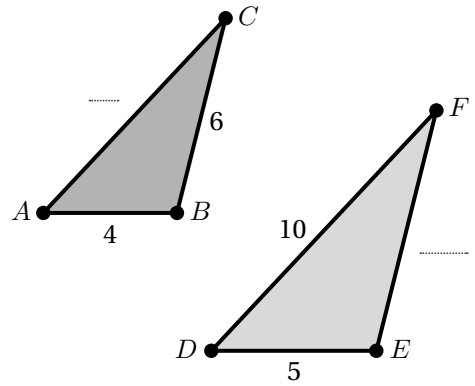
Show What You Know



2.08

Triangles ABC and DEF are similar.

- a Determine the missing values.
- b Explain your thinking.



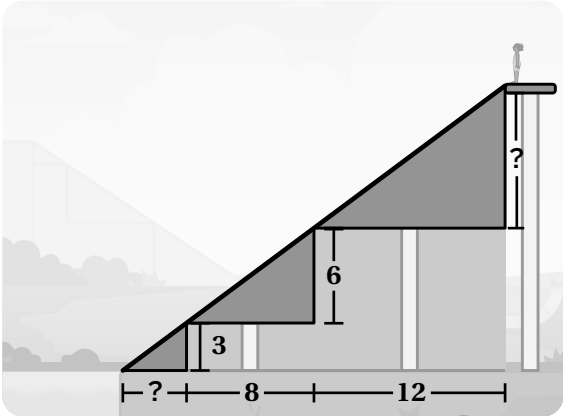
Show What You Know



2.09

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	

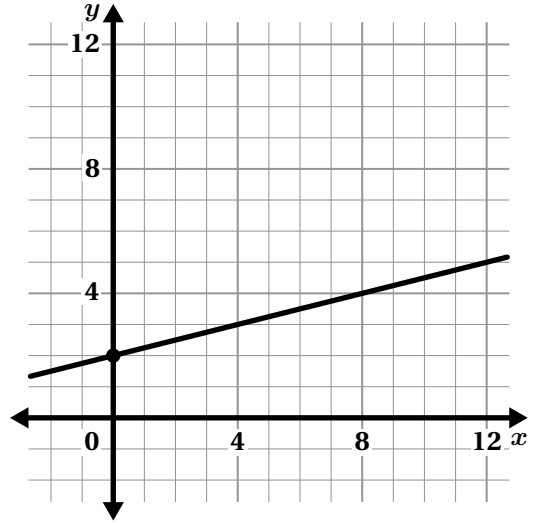


Show What You Know



2.10

Determine the slope of this line.



Show What You Know Lesson 1

Name: _____ Date: _____ Period: _____

Show What You Know 2.01

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.

Grade 8 77 © Amplify Education, Inc. and its licensors. Amplify Distance Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 2

Name: _____ Date: _____ Period: _____

Show What You Know 2.02

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 BM is 20 feet, and $5 \cdot 4 = 20$.

Grade 8 78 © Amplify Education, Inc. and its licensors. Amplify Distance Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 3

Name: _____ Date: _____ Period: _____

Show What You Know 2.03

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.

Grade 8 79 © Amplify Education, Inc. and its licensors. Amplify Distance Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 4

Name: _____ Date: _____ Period: _____

Show What You Know 2.04

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

Grade 8 80 © Amplify Education, Inc. and its licensors. Amplify Distance Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 5

Name: _____ Date: _____ Period: _____

Show What You Know 2.05

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.

Grade 8 81 © Amplify Education, Inc. and its licensors. Amplify Geometry Math is based on materials from Illustrative Mathematics (IM) and Open Up Resources.

Show What You Know Lesson 6

Name: _____ Date: _____ Period: _____

Show What You Know 2.06

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 $\frac{2}{3}$ between the corresponding sides.

Grade 8 82 © Amplify Education, Inc. and its licensors. Amplify Geometry Math is based on materials from Illustrative Mathematics (IM) and Open Up Resources.

Show What You Know Lesson 7

Name: _____ Date: _____ Period: _____

Show What You Know 2.07

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.

Grade 8 83 © Amplify Education, Inc. and its licensors. Amplify Geometry Math is based on materials from Illustrative Mathematics (IM) and Open Up Resources.

Show What You Know Lesson 8

Name: _____ Date: _____ Period: _____

Show What You Know 2.08

Triangles ABC and DEF are similar.

Determine the missing values.

Responses shown on diagram.


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.

Grade 8 84 © Amplify Education, Inc. and its licensors. Amplify Geometry Math is based on materials from Illustrative Mathematics (IM) and Open Up Resources.

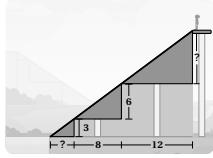
Show What You Know Lesson 9

Name: _____ Date: _____ Period: _____

Show What You Know  2.09

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



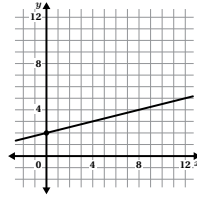
Grade 8 85 © Amplify Education, Inc. and its licensors. Amplify Essential Math is based on curricula from Illustrative Mathematics (IM) and Open Up Resources.

Show What You Know Lesson 10

Name: _____ Date: _____ Period: _____

Show What You Know  2.10

Determine the slope of this line.
 $\frac{1}{2}$ (or equivalent)



Grade 8 86 © Amplify Education, Inc. and its licensors. Amplify Essential Math is based on curricula from Illustrative Mathematics (IM) and Open Up Resources.

Unit 3

Assessments and Rubrics

Pre-Unit Check

Unit 3

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?

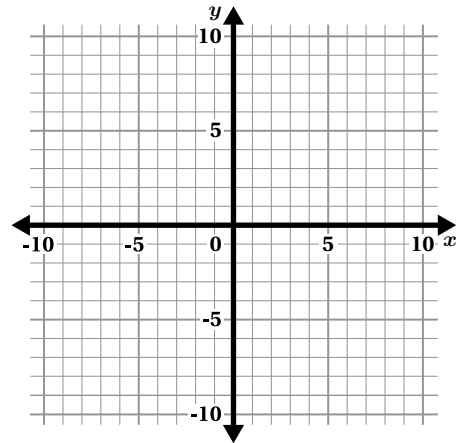
Pre-Unit Check (continued)

Unit 3

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.

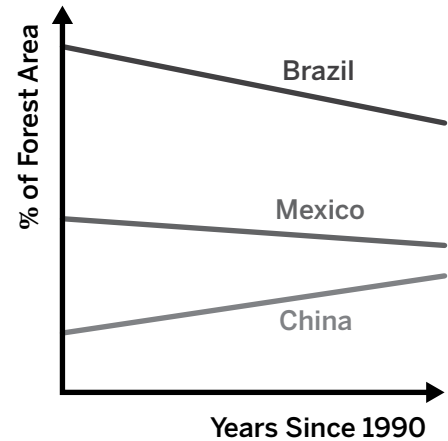


Sub-Unit Quiz**Unit 3**

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.



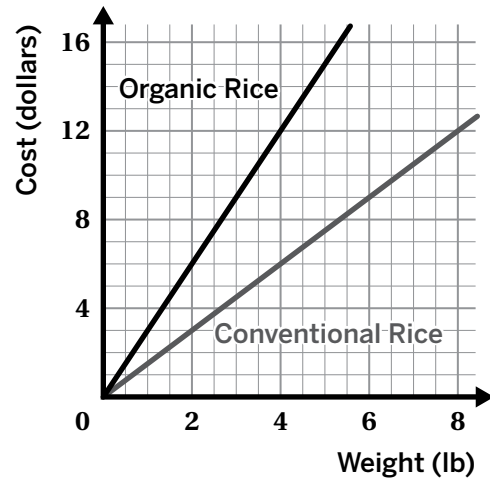
2. Determine whether the linear relationship is *proportional* or *non-proportional*.

- a A plant is initially 2 centimeters tall and grows 3 centimeters every month for six months.
- b $y = 5x$

Sub-Unit Quiz (continued)

Unit 3

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.

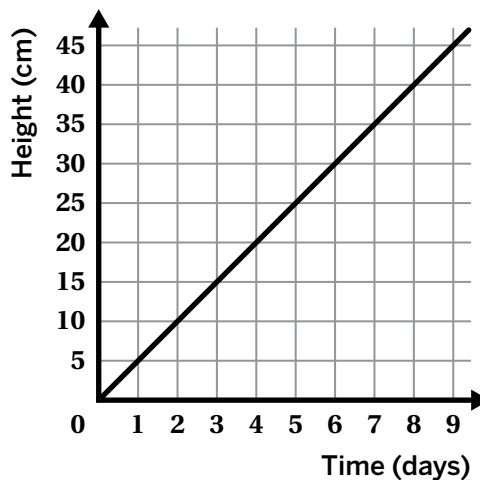
- A. The cost vs. weight relationships for both organic and conventional rice are proportional relationships.
 - B. The cost as a unit rate for conventional rice is \$1.50 per pound.
 - C. Conventional rice costs twice as much per pound as organic rice.
 - D. It costs \$8 to buy 12 pounds of conventional 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

$$h = 1.5t$$

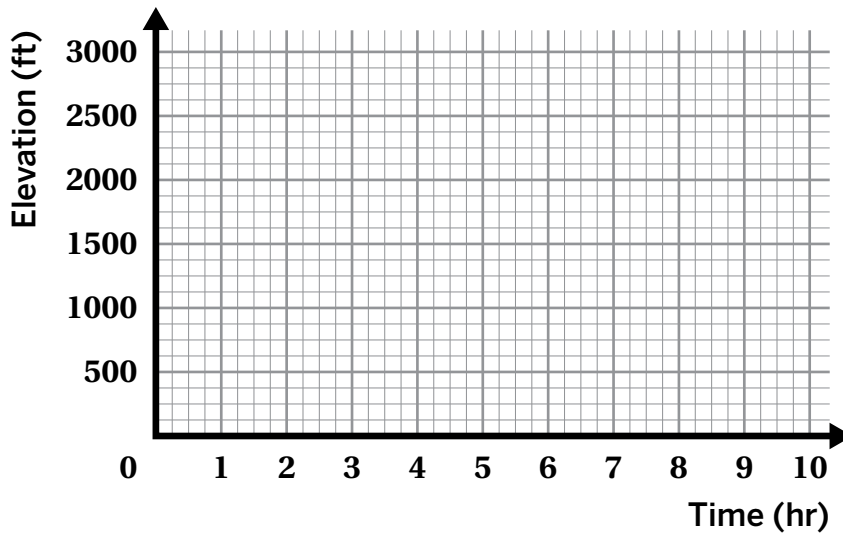
Which of the three plants grew the fastest? Explain your thinking.

Sub-Unit Quiz (continued)

Unit 3

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

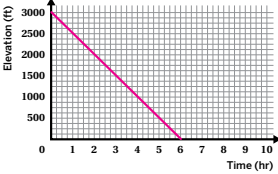
Problem 1				Standard: MA.8.AR.3.5, MTR.7.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct choice: The percentage of forest area in Brazil decreased at a constant rate.</p>			<p>Incorrect choice. Students who select <i>The percentage of forest area in Mexico decreased faster than it did in Brazil</i> may have noticed that the percentage of forest area is decreasing for both Mexico and Brazil.</p>	

Problem 2a				Standard: MA.8.AR.3.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response: Non-proportional</p>			<p>Incorrect response. Students who respond with <i>proportional</i> may have only considered the 3 centimeters the plant grows every month.</p>	

Problem 2b				Standard: MA.8.AR.3.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response: Proportional</p>			<p>Incorrect response. Students who respond with <i>non-proportional</i> may not realize that the graph of the equation $y = 5x$ will pass through the origin.</p>	

Problem 3			
Standards: MA.8.AR.3.2, MA.8.AR.3.3, MTR.7.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>All correct choices and no incorrect choices.</p> <ul style="list-style-type: none"> 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 $c = 3w$. 	<p>One or two correct choices and no incorrect choices.</p> <p>All correct choices and one incorrect choice.</p>	<p>One or two correct choices and one incorrect choice.</p>	<p>Only incorrect choices.</p> <p>Two or more incorrect choices with some correct choices.</p>

Problem 4			
Standards: MA.8.AR.3.2, MA.8.AR.3.5, MTR.2.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p>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.</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Correct response with minor flaws in explanation.</p> <p>E.g., Response includes minor arithmetic errors in calculating slope from Plant 1 or Plant 2.</p> <p>Students who choose Plant 1 may not have noticed the x-values increase by 2 in each row.</p>	<p>Correct response with incomplete explanation.</p> <p>E.g., Response includes explanation of finding slope for two of the plants.</p> <p>Incorrect response with explanation that shows partial understanding.</p> <p>E.g., Students switch the x- and y-values when finding the slope for Plant 1 or Plant 2.</p>	<p>Incorrect response with no explanation.</p>

Problem 5a		Standards: MA.8.AR.3.4, MTR.7.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct graph:</p> 	<p>Graph shows conceptual understanding with minor errors.</p> <p>E.g., Response includes “lines with a y-intercept of 3000” or “a slope of -500” but not both.</p>	<p>Graph shows incomplete understanding with significant errors.</p>	<p>Graph shows limited understanding.</p>

Problem 5b		Standards: MA.8.AR.3.5, MTR.2.1, MTR.7.1									
4 Meeting	3 Approaching	2 Developing	1 Beginning								
<p>Correct response:</p> <table border="1"> <thead> <tr> <th>Time (hr)</th> <th>Elevation (ft)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>3000</td> </tr> <tr> <td>2</td> <td>2000</td> </tr> <tr> <td>5</td> <td>500</td> </tr> </tbody> </table>	Time (hr)	Elevation (ft)	0	3000	2	2000	5	500	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Two correct responses.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., One correct response.</p>	<p>Response shows limited understanding.</p>
Time (hr)	Elevation (ft)										
0	3000										
2	2000										
5	500										

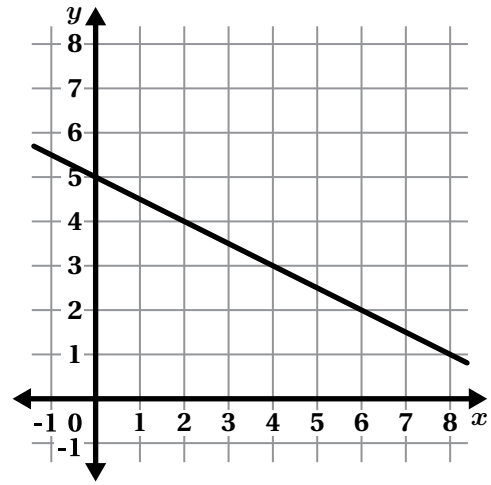
Problem 5c		Standards: MA.8.AR.3.3, MTR.2.1, MTR.7.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>$f = 3000 - 500t$ (or equivalent)</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write $f = 3000t - 500$ may understand that the elevation started at 3000 feet and decreases by 500 feet each hour.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write $f = 3000 - 500$ may understand that the elevation started at 3000 feet and decreases by 500 feet each hour.</p>	<p>Response shows limited understanding.</p>

End-of-Unit Assessment

Unit 3

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

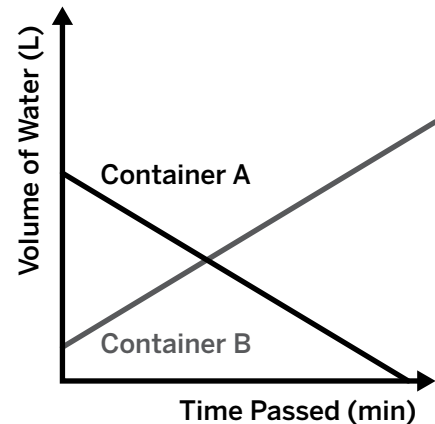
- A. (0, 5)
- B. (0, 10)
- C. (1, 2)
- D. (5, 0)
- E. (10, 0)



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?

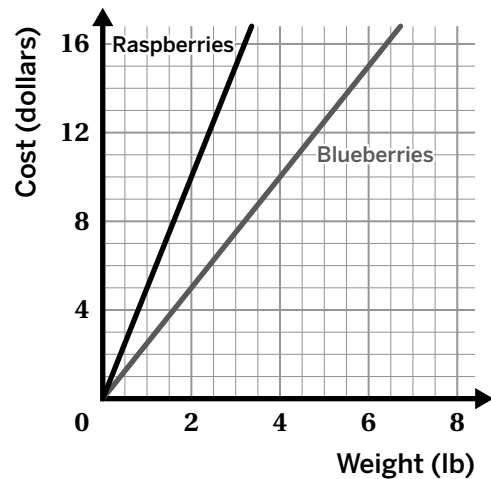
- A. The relationship between time and amount of water for Container A is proportional.
- B. The amount of water in Container A decreased at a constant rate.
- C. Initially, there was more water in Container B than in Container A.
- D. The amount of water in Container A increased each minute.



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

Select *all* of the true statements.

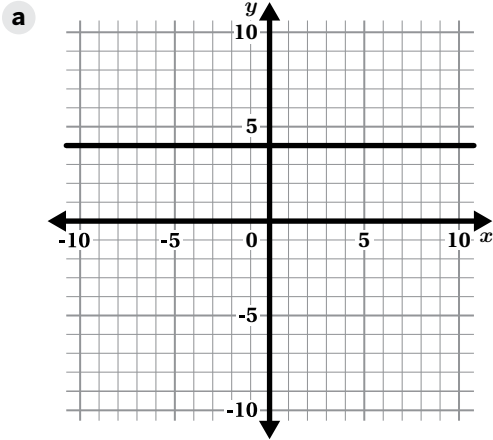
- A. The cost vs. weight relationship for both blueberries and raspberries are proportional relationships.
- B. The cost as a unit rate for blueberries is \$5 per pound.
- C. Raspberries cost half as much as blueberries.
- D. It costs \$10 to buy 4 pounds of raspberries.
- E. The relationship between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



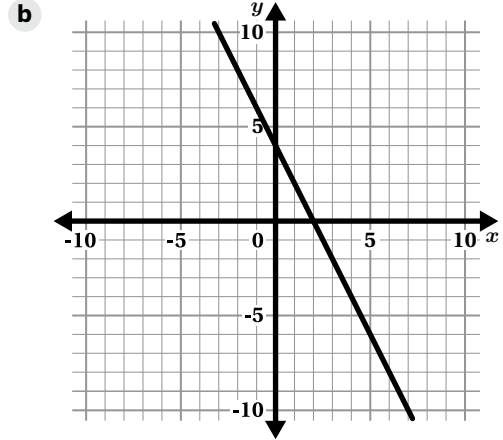
End-of-Unit Assessment (continued)

Unit 3

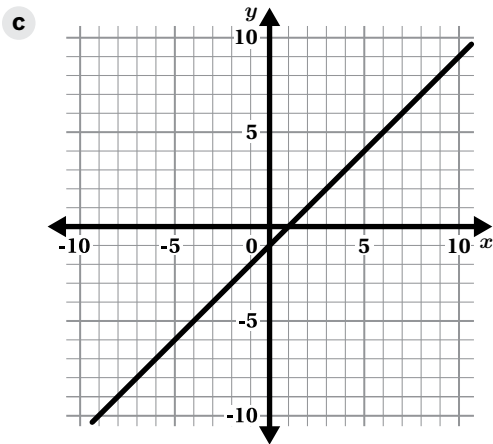
4. Write an equation for each line.



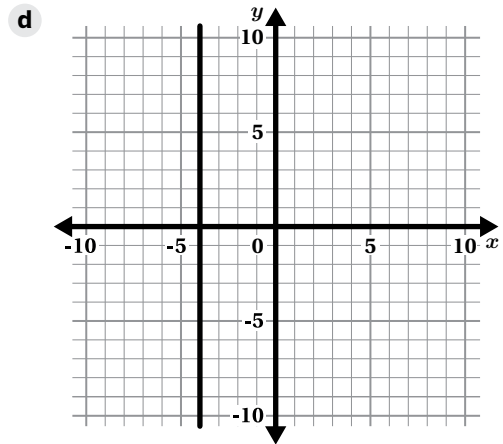
Equation:



Equation:



Equation:

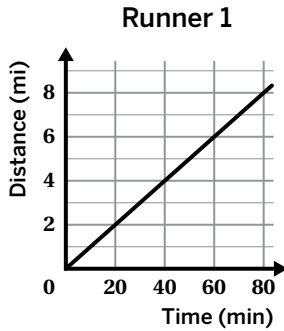


Equation:

End-of-Unit Assessment (continued)

Unit 3

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



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.

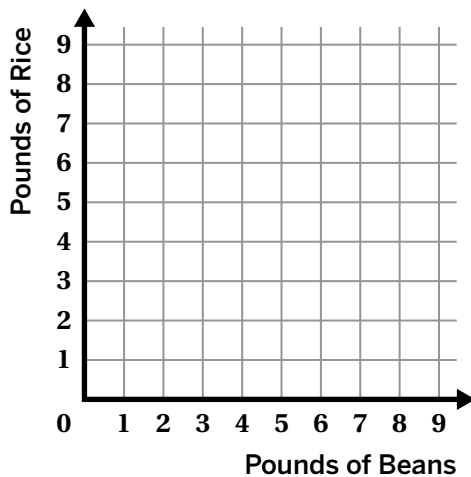
6. Beans cost \$1.50 per pound. Rice costs \$1.00 per pound. Joel has \$7.50 for beans and rice.

- 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.

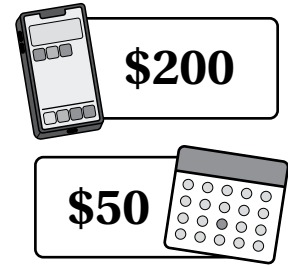
- c Draw a graph of the pounds of beans, b , and rice, r , Joel can buy for \$7.50.



End-of-Unit Assessment (continued)

Unit 3

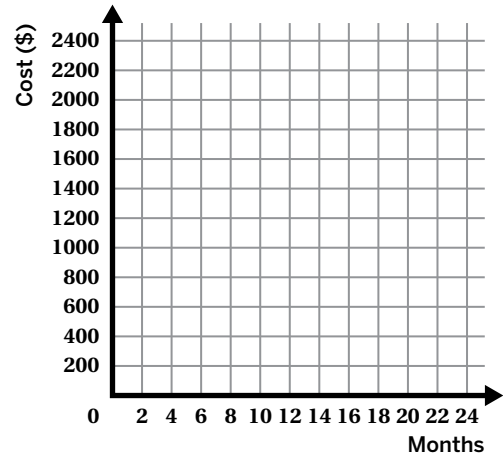
7. A cell phone plan costs \$200 to start. Then there is a \$50 charge each month.



- 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
<p>Both correct choices and no incorrect choices.</p> <ul style="list-style-type: none"> • (0, 5) • (10, 0) 	<p>One correct choice and no incorrect choices.</p> <p>Both correct choices and one incorrect choice.</p>	<p>One correct choice and one incorrect choice.</p>	<p>Only incorrect choices.</p> <p>Two or more incorrect choices with some correct choices.</p>

Problem 2 Standards: MA.8.AR.3.5, MTR.6.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice:</p> <p>The amount of water in Container A decreased at a constant rate.</p>			<p>Incorrect choice.</p>

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
<p>All correct choices and no incorrect choices.</p> <ul style="list-style-type: none"> • 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 $c = 5w$. 	<p>One, two, or three correct choices and no incorrect choice.</p>	<p>One, two, or three choices and one incorrect choice.</p>	<p>One or two correct choices and one incorrect choice.</p>

Problem 4a			Standard: MA.8.AR.3.3
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: $y = 4$</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write $x = 4$ or 4 may not understand the meaning of the equation of a line.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>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.</p>	<p>Response shows limited understanding.</p>

Problem 4b			Standard: MA.8.AR.3.3
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: $y = 4 - 2x$ (or equivalent)</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write $y = 2x + 4$ may have correctly identified the y-intercept, but may not understand the difference between positive and negative slopes.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write $y = -2x$ or $y = 4$ may have correctly identified the y-intercept or slope, but not both.</p>	<p>Response shows limited understanding.</p>

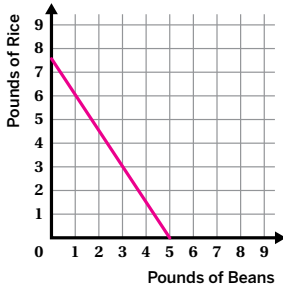
Problem 4c			Standard: MA.8.AR.3.3
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: $y = x - 1$ (or equivalent)</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write $y = x + 1$ or $y = -x - 1$ may have correctly identified the slope or y-intercept, but made an error interpreting the signs.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write $y = 1x$ or $y = -1$ may have correctly identified the y-intercept or slope, but not both.</p>	<p>Response shows limited understanding.</p>

Problem 4d		Standard: MA.8.AR.3.3	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: $x = -4$</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write $y = 4$ or 4 may recall that often the equation of a line begins with $y =$ [something].</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write $y = -4x - 4$ may be familiar with the equation of a line, but not understand what each value represents.</p>	<p>Response shows limited understanding.</p>

Problem 5		Standards: MA.8.AR.3.2, MTR.2.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p>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.</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Correct response with minor flaws in explanation.</p> <p>E.g., Incorrect response with logical and complete explanation.</p> <p>Students who select Runner 1 may think that the greatest number of minutes per mile corresponds to the fastest pace.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Correct response with incomplete explanation.</p> <p>E.g., Incorrect response with explanation that communicates partial understanding.</p> <p>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.</p>	<p>Response shows limited understanding.</p> <p>E.g., Incorrect response with incorrect explanation or without an explanation.</p>

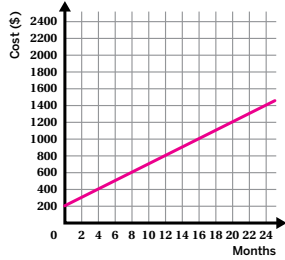
Problem 6a		Standards: MA.8.AR.3.2, MTR.6.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct responses:</p> <ul style="list-style-type: none"> • (1, 6) • (3, 3) • (5, 0) 	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Two correct responses.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., One correct response.</p>	<p>Response shows limited understanding.</p> <p>E.g., Work does not consider the \$7.50 constraint.</p>

Problem 6b			
Standards: MA.8.AR.3.3, MTR.6.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>$1.5b + 1r = 7.5$, or a correct equation based on an incorrect table in 6a.</p>	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>

Problem 6c			
Standards: MA.8.AR.3.4, MTR.6.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct graph:</p> 	<p>Graph shows conceptual understanding with minor errors.</p> <p>E.g., Graph contains only the three points from the table, even if the table is incorrect.</p>	<p>Graph shows incomplete understanding with significant errors.</p> <p>E.g., Reasonable graph that includes a line but is not based on the given relationship.</p>	<p>Graph shows limited understanding.</p>

Problem 7a			
Standards: MA.8.AR.3.5, MTR.7.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>\$300</p>	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write \$500 may have calculated the cost for 1 month and then doubled it.</p>	<p>Response shows limited understanding.</p>

Problem 7b			
Standards: MA.8.AR.3.3, MTR.7.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>$y = 200 + 50x$</p>	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write $y = 50 + 200x$ (or equivalent) may recognize that the relationship is linear.</p>	<p>Response shows limited understanding.</p>

Problem 7c			
Standards: MA.8.AR.3.4, MTR.7.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> 	<p>Graph shows conceptual understanding with minor errors.</p>	<p>Graph shows incomplete understanding with significant errors.</p> <p>E.g., Graph has the correct slope but does not include the starting cost.</p>	<p>Graph shows limited understanding.</p>

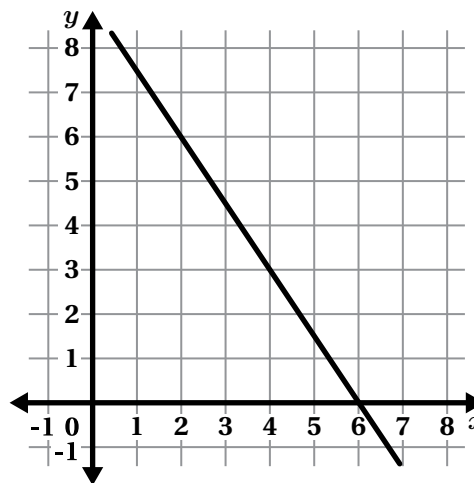
Problem 7d			
Standards: MA.8.AR.3.5, MTR.7.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p><i>Responses vary. The graph of the new plan would have a different vertical intercept but the same slope as the graph of the first plan. The lines would be parallel to each other because their slopes are the same.</i></p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response only describes how the graphs would be the same or different, but not both.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response discusses the context but does not compare the graphs.</p>	<p>Response shows limited understanding.</p>

End-of-Unit Assessment

Unit 3

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

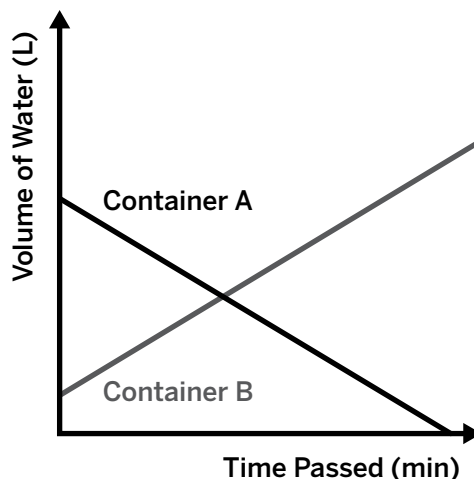
- A. (0, 6)
- B. (0, 9)
- C. (2, 6)
- D. (6, 0)
- E. (9, 0)



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?

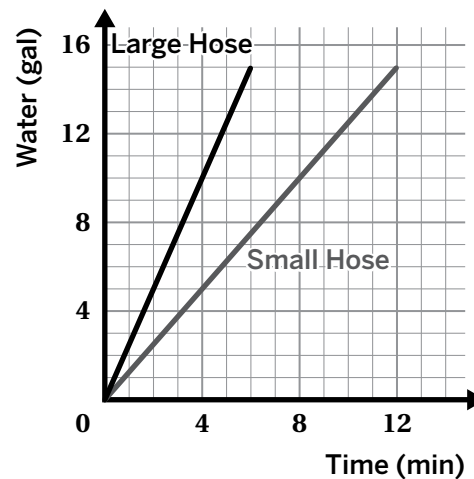
- A. The amount of water in Container A increased each minute.
- B. The amount of water in Container B decreased at a constant rate.
- C. The relationship between time and amount of water for Container B is proportional.
- D. Initially, there was more water in Container A than in Container B.



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.

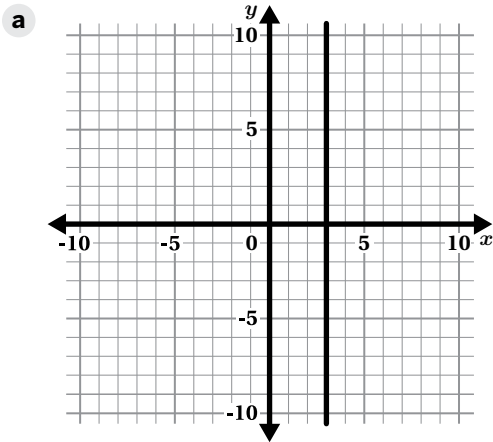
- A. The amount of water in the pool vs. time relationship for both the large and small hoses are proportional relationships.
- B. It takes 6 minutes to fill the pool with the large hose and 12 minutes with the small hose.
- C. The speed as a unit rate for filling the pool with the large hose is 2.5 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 $w = 2.5t$.



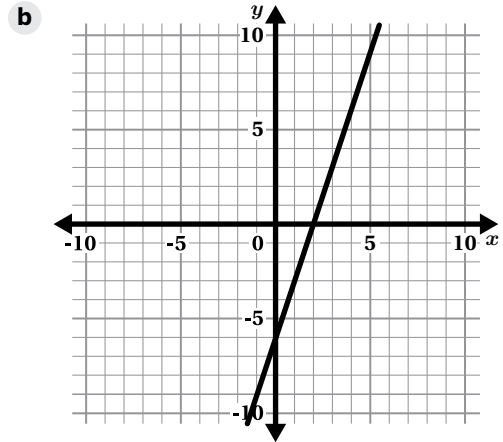
End-of-Unit Assessment (continued)

Unit 3

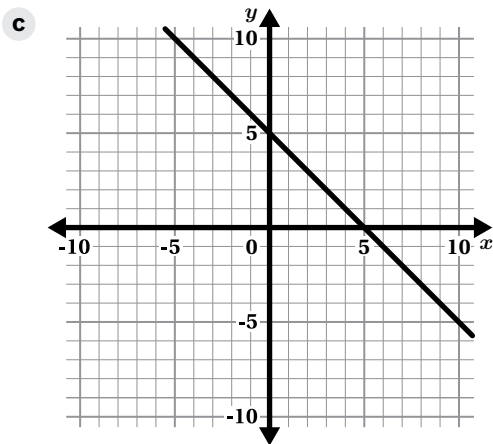
4. Write an equation for each line.



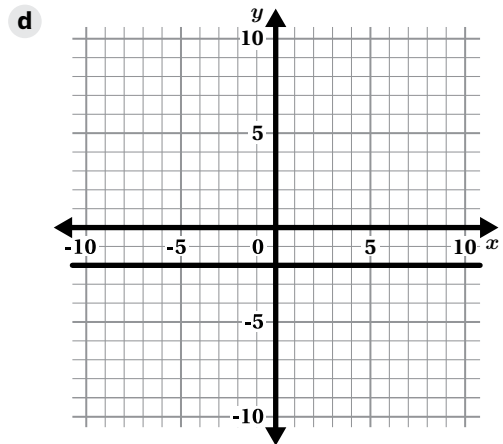
Equation:



Equation:



Equation:

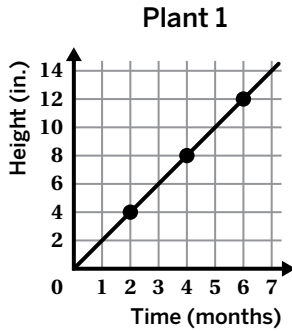


Equation:

End-of-Unit Assessment (continued)

Unit 3

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



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.)

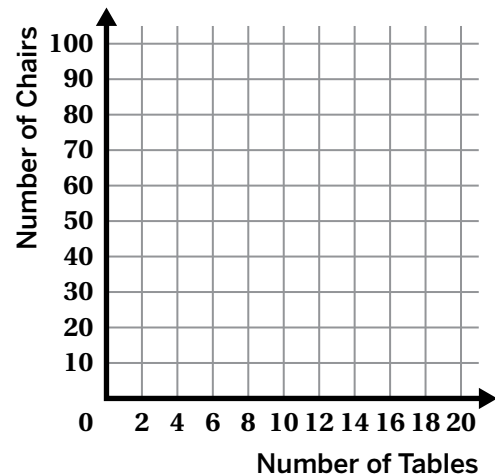
Which plant is growing the slowest? Explain your thinking.

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

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

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)

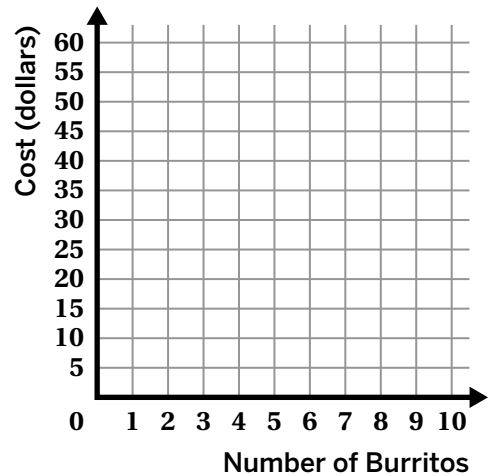
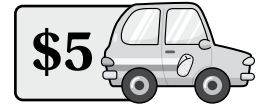
Unit 3

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
<p>All correct choices and no incorrect choices.</p> <ul style="list-style-type: none"> (0, 9) (2, 6) (6, 0) 	<p>One or two correct choices and no incorrect choices.</p> <p>All correct choices and one incorrect choice.</p>	<p>One or two correct choices and one incorrect choice.</p>	<p>Only incorrect choices.</p> <p>Two or more incorrect choices with some correct choices.</p>

Problem 2			Standards: MA.8.AR.3.5, MTR.6.1
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice:</p> <p>Initially, there was more water in Container A than in Container B.</p>			<p>Incorrect choice.</p>

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
<p>All correct choices and no incorrect choices.</p> <ul style="list-style-type: none"> 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. 	<p>One or two correct choices and no incorrect choices.</p> <p>All correct choices and one incorrect choice.</p>	<p>One or two correct choices and one incorrect choice.</p>	<p>Only incorrect choices.</p> <p>Two or more incorrect choices with some correct choices.</p>

Problem 4a				Standard: MA.8.AR.3.3
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response: $x = 3$</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write $y = 3$ or 3 may recall that often the equation of a line begins with $y =$ [something].</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write $y = 3x + 3$ may be familiar with the equation of a line, but not understand what each value represents.</p>	<p>Response shows limited understanding.</p>	

Problem 4b				Standard: MA.8.AR.3.3
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response: $y = -6 + 3x$ (or equivalent)</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>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.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write $y = 3x$ or $y = -6$ may have correctly identified the y-intercept or slope, but not both.</p>	<p>Response shows limited understanding.</p>	

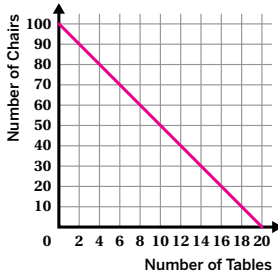
Problem 4c				Standard: MA.8.AR.3.3
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response: $y = -x + 5$ (or equivalent)</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write $y = x + 5$ may have correctly identified the y-intercept, but may not understand the difference between positive and negative slopes.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write $y = x$ or $y = 5$ may have correctly identified the y-intercept or slope, but not both.</p>	<p>Response shows limited understanding.</p>	

Problem 4d Standard: MA.8.AR.3.3			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: $y = -2$</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write $x = -2$ or -2 may not understand the meaning of the equation of a line.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>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.</p>	<p>Response shows limited understanding.</p>

Problem 5 Standards: MA.8.AR.3.2, MTR.2.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p><i>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.</i></p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Correct response with minor flaws in explanation.</p> <p>E.g., Incorrect response with logical and complete explanation.</p> <p>Students who select Plant 3 may have answered the question "Which plant is growing the fastest?"</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Correct response with incomplete explanation.</p> <p>E.g., Incorrect response with explanation that communicates partial understanding.</p> <p>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.</p>	<p>Response shows limited understanding.</p> <p>E.g., Incorrect response with incorrect explanation or without an explanation.</p>

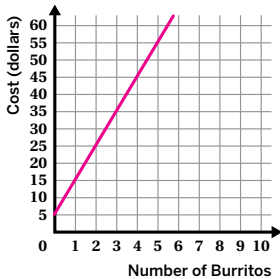
Problem 6a Standards: MA.8.AR.3.2, MTR.6.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct responses:</p> <ul style="list-style-type: none"> • $(1, 95)$ • $(8, 60)$ • $(20, 0)$ 	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Two correct responses.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., One correct response.</p>	<p>Response shows limited understanding.</p> <p>E.g., Work does not consider the 1,000-pound constraint.</p>

Problem 6b		Standards: MA.8.AR.3.3, MTR.6.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>$50t + 10c = 1000$ (or equivalent), or a correct equation based on an incorrect table in 6a.</p>	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>

Problem 6c		Standards: MA.8.AR.3.4, MTR.6.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct graph:</p> 	<p>Graph shows conceptual understanding with minor errors.</p> <p>E.g., Graph contains only the three points from the table, even if the table is incorrect.</p>	<p>Graph shows incomplete understanding with significant errors.</p> <p>E.g., Reasonable graph that includes a line but is not based on the given relationship.</p>	<p>Graph shows limited understanding.</p>

Problem 7a		Standards: MA.8.AR.3.5, MTR.7.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>\$45</p>	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write \$60 may have calculated the cost to deliver 1 burrito and then multiplied by 4.</p>	<p>Response shows limited understanding.</p>

Problem 7b			
Standards: MA.8.AR.3.3, MTR.7.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>$y = 5 + 10x$</p>	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write $y = 5x + 10$ (or equivalent) may recognize that the relationship is linear.</p>	<p>Response shows limited understanding.</p>

Problem 7c			
Standards: MA.8.AR.3.4, MTR.7.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> 	<p>Graph shows conceptual understanding with minor errors.</p>	<p>Graph shows incomplete understanding with significant errors.</p> <p>E.g., Graph has the correct slope but does not include the starting cost.</p>	<p>Graph shows limited understanding.</p>

Problem 7d			
Standards: MA.8.AR.3.5, MTR.7.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p><i>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.</i></p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response only describes how the graphs would be the same or different, but not both.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response discusses the context but does not compare the graphs.</p>	<p>Response shows limited understanding.</p>

Unit 3

**Show What You
Know PDFs**

Show What You Know

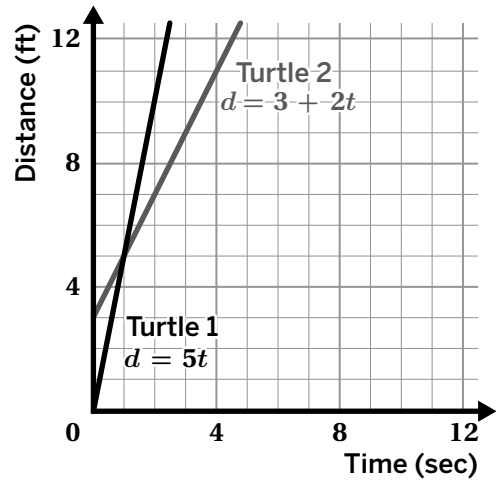


3.01

This graph shows the distance vs. time relationship for two turtles. Both turtles start the race at the same time.

Select *all* the true statements.

- A. The relationship between distance and time is proportional for Turtle 1.
- B. At 3 seconds, Turtle 2 is 12 feet from the start.
- C. The speed as a unit rate for Turtle 1 is 5 feet per second.
- D. The relationship between distance and time is proportional for Turtle 2.
- E. Turtle 2 has a head start.

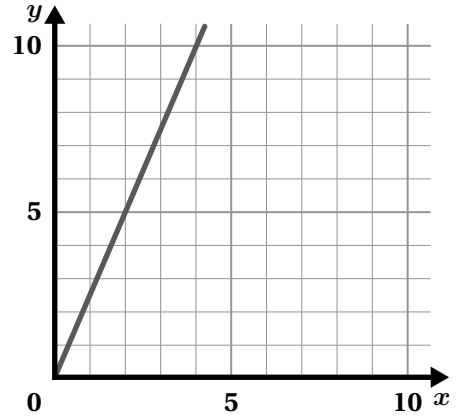


Show What You Know



3.02

Write an equation for this graph.

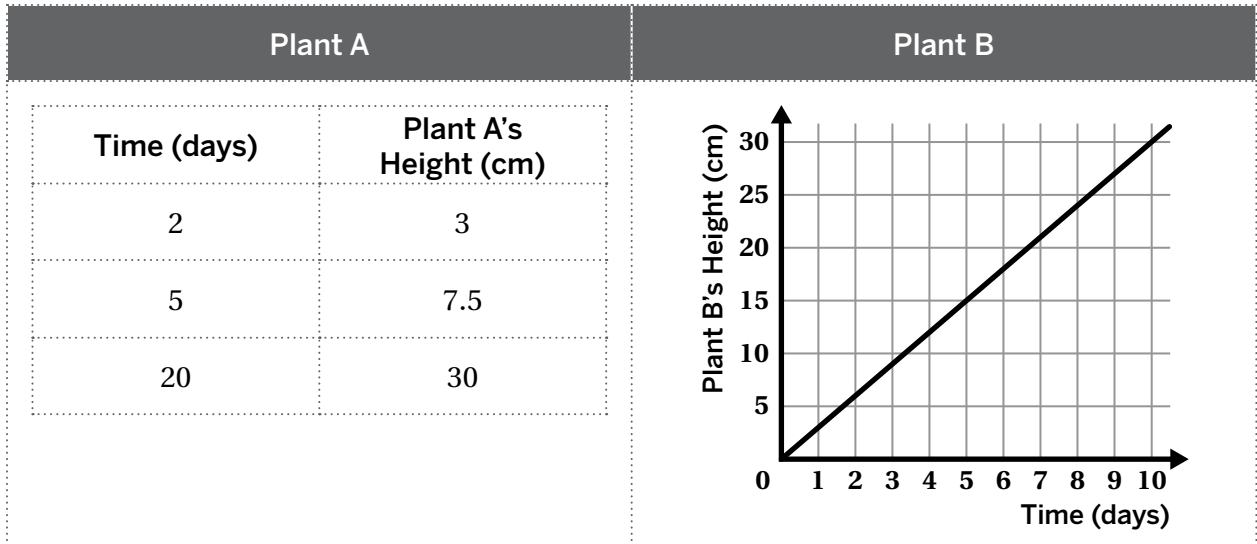


Show What You Know



3.03

Ramon planted two seeds and measured the heights of the plants each day. Both plants grew at a constant rate.



Which plant grew at a faster rate?

Plant A

Plant B

They grow at the same rate

Explain your thinking.

Show What You Know



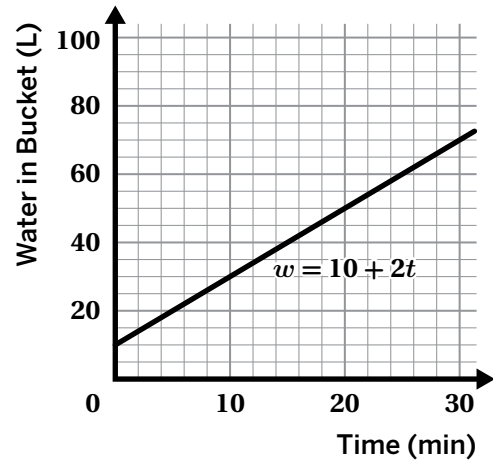
3.04

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.



Show What You Know

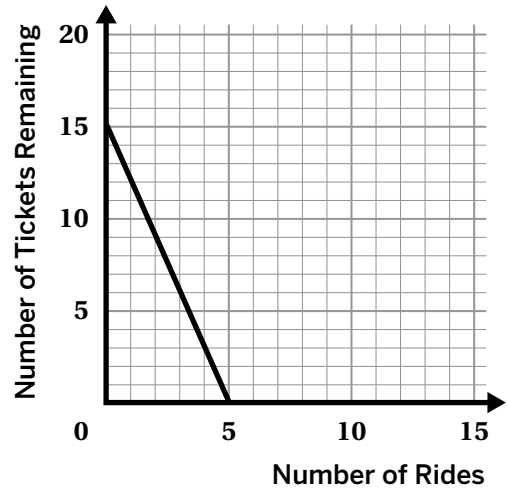


3.05

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:

Show What You Know**3.06**

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. $y = -3x + 50$

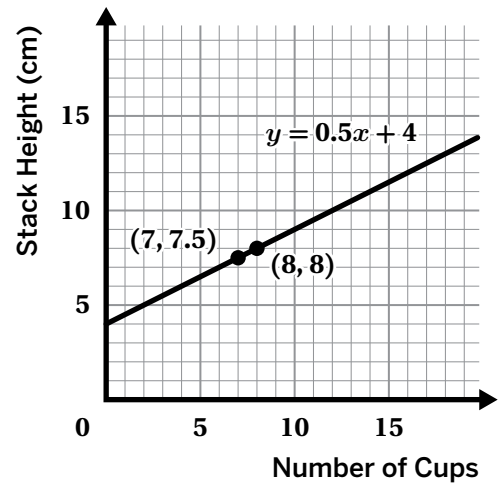
Show What You Know



3.07

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?

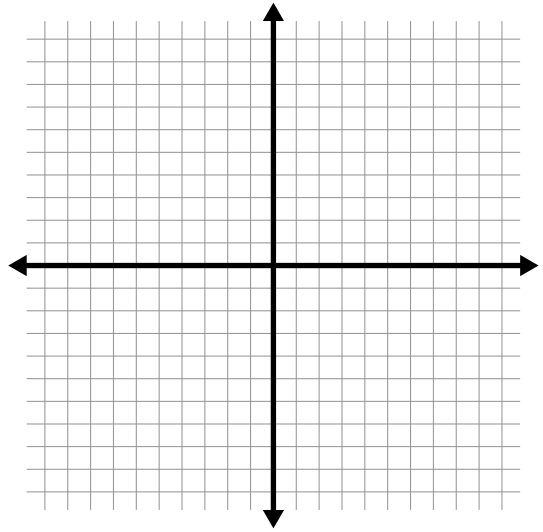


Show What You Know



3.08

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



Show What You Know

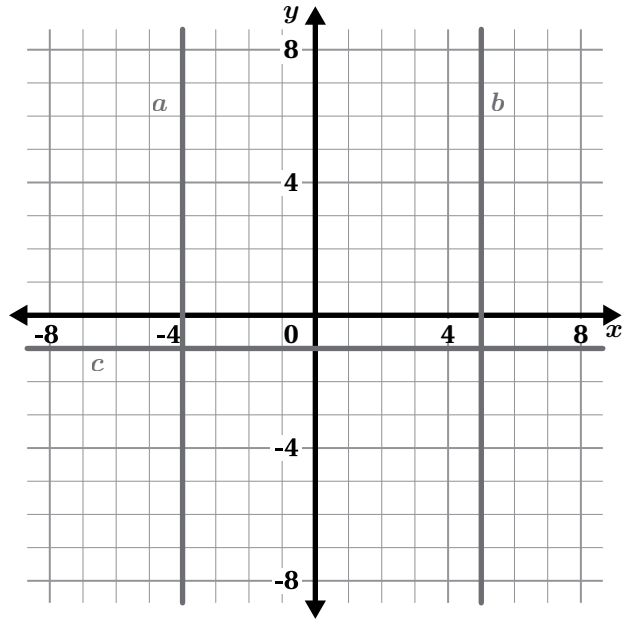


3.09

Here are three lines on a coordinate plane.

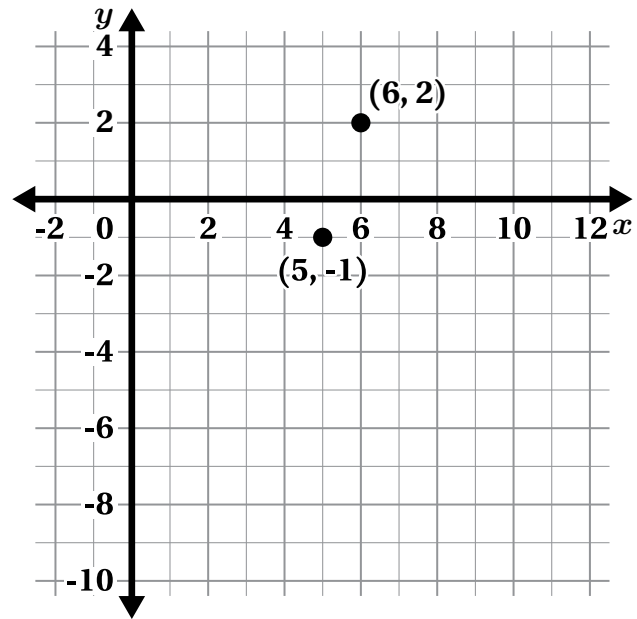
Write an equation for each line.

Line	Equation
<i>a</i>	
<i>b</i>	
<i>c</i>	



Show What You Know**3.10**

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



Show What You Know



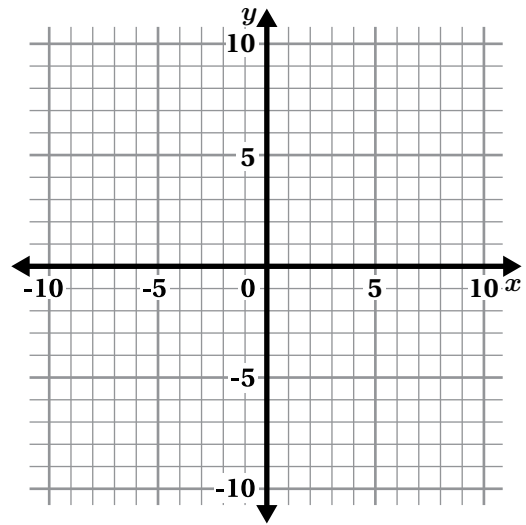
3.11

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.

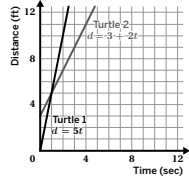


Show What You Know Lesson 1

Name: _____ Date: _____ Period: _____

Show What You Know  **3.01**

This graph shows the distance vs. time relationship for two turtles. Both turtles start the race at the same time.




Select all the true statements.

- A. The relationship between distance and time is proportional for Turtle 1.
- B. At 3 seconds, Turtle 2 is 12 feet from the start.
- C. The speed as a unit rate for Turtle 1 is 5 feet per second.
- D. The relationship between distance and time is proportional for Turtle 2.
- E. Turtle 2 has a head start.

Grade 8 **123** © Amplify Education, Inc. and its licensors. Amplify Distance Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

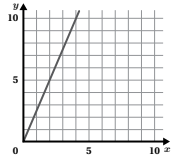
Show What You Know Lesson 2

Name: _____ Date: _____ Period: _____

Show What You Know  **3.02**

Write an equation for this graph.


$y = \frac{3}{2}x$ (or equivalent)



Grade 8 **124** © Amplify Education, Inc. and its licensors. Amplify Distance Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

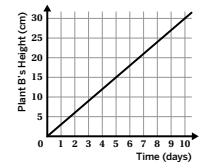
Show What You Know Lesson 3

Name: _____ Date: _____ Period: _____

Show What You Know  **3.03**

Ramon planted two seeds and measured the heights of the plants each day. Both plants grew at a constant rate.

Plant A	
Time (days)	Plant A's Height (cm)
2	3
5	7.5
20	30




Which plant grew at a faster rate?
 Plant A **Plant B** They grow at the same rate.

Explain your thinking.
 Responses vary. The point (5, 15) is on Plant B's graph, so Plant B's growth rate is 3 centimeters per day. From the table proportional relationship, so, you can calculate the unit rate for Plant A, $3 \div 2 = 1.5$ centimeters per day, and see that it is a slower rate than Plant B.

Grade 8 **125** © Amplify Education, Inc. and its licensors. Amplify Distance Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

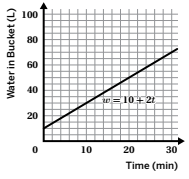
Show What You Know Lesson 4

Name: _____ Date: _____ Period: _____

Show What You Know  **3.04**

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.

Grade 8 **126** © Amplify Education, Inc. and its licensors. Amplify Distance Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 5

Name: _____ Date: _____ Period: _____

Show What You Know 3.05

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.

Grade 8 127 © Amplify Education, Inc. and its licensors. Amplify Essential Math is based on resources from Illustrative Mathematics (IM) and Open Up Resources.

Show What You Know Lesson 6

Name: _____ Date: _____ Period: _____

Show What You Know 3.06

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. $y = -3x + 50$

Grade 8 128 © Amplify Education, Inc. and its licensors. Amplify Essential Math is based on resources from Illustrative Mathematics (IM) and Open Up Resources.

Show What You Know Lesson 7

Name: _____ Date: _____ Period: _____

Show What You Know 3.07

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.

Grade 8 129 © Amplify Education, Inc. and its licensors. Amplify Essential Math is based on resources from Illustrative Mathematics (IM) and Open Up Resources.

Show What You Know Lesson 8

Name: _____ Date: _____ Period: _____


Show What You Know 3.08

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)

Grade 8 130 © Amplify Education, Inc. and its licensors. Amplify Essential Math is based on resources from Illustrative Mathematics (IM) and Open Up Resources.

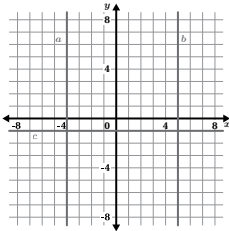
Show What You Know Lesson 9

Name: _____ Date: _____ Period: _____

Show What You Know  3.09

Here are three lines on a coordinate plane.
Write an equation for each line.


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



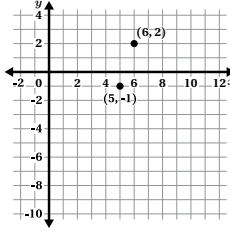
Grade 8 **131** © Angify Education, Inc. and its licensors. Angify District Math is based on content from Illustrative Mathematics (IM) and Open Up Resources.

Show What You Know Lesson 10

Name: _____ Date: _____ Period: _____

Show What You Know  3.10


Write an equation of a line that goes through (5, -1) and (6, 2).
 $y = 3x - 16$



Grade 8 **132** © Angify Education, Inc. and its licensors. Angify District Math is based on content from Illustrative Mathematics (IM) and Open Up Resources.

Show What You Know Lesson 11

Name: _____ Date: _____ Period: _____

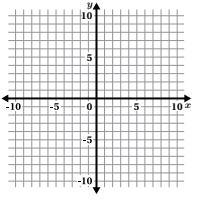
Show What You Know  3.11

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.



Grade 8 **133** © Angify Education, Inc. and its licensors. Angify District Math is based on content from Illustrative Mathematics (IM) and Open Up Resources.

Unit 4

Assessments and Rubrics

Pre-Unit Check

Unit 4

1. Write each expression with the fewest number of terms.

a $4x + 3x$

b $3x + 5x - 1$

c $5 + 2x + 7 + 4x$

d $4 - 2x + 5x$

e $10x - 5 + 3x - 2$

2. Which of these expressions is equivalent to $3(x - 2)$?

A. $3x - 6$

B. $3x - 2$

C. $3x + 2$

D. $3x + 6$

3. Which of these expressions is equivalent to $-2(x - 5)$?

A. $-2x - 5$

B. $-2x + 5$

C. $-2x + 10$

D. $-2x - 10$

Pre-Unit Check (continued)**Unit 4**

- 4.** For each equation, determine the value of x that makes the equation true.
Show your thinking.

a $x \div 3 = 12$

b $2x + 3 = 20$

c $\frac{4}{3}x = \frac{10}{3}$

d $-4x = -24$

e $2(x - 4) = 10$

f $-0.5x + 1.1 = -2.9$

Pre-Unit Check (continued)**Unit 4**

5. For each equation, determine whether $x = 2$ is a solution to the equation. Show or explain your thinking.

a $-2(x - 4) = 4$

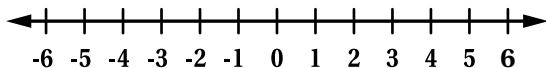
b $\frac{26}{x} = 13$

c $-3.8x = -7.4$

d $4(x - (-1)) = -8$

Sub-Unit Quiz**Unit 4**

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:
 $12x + 16 = 20x$.

Sub-Unit Quiz (continued)**Unit 4**

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

Problem 1		 Standard: MA.8.AR.2.2	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: $x \leq -1$ Graph shows a closed circle at -1 with a ray pointing to the left.</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Solution is $x \geq -1$. Graph shows a closed circle at -1 with a ray pointing to the right.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Solution is $x = -1$. Graph shows a closed circle at -1.</p>	<p>Response shows limited understanding.</p>

Problem 2		 Standard: MA.8.AR.2.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>All correct choices and no incorrect choices.</p> <ul style="list-style-type: none"> • $7x = 7x$ • $10 - 19 + 12x = 4x - 9 + 8x$ • $\frac{1}{2}(6x + 5) = 3x + 2.5$ 	<p>One or two correct choices and no incorrect choices.</p> <p>All correct choices and one incorrect choice.</p>	<p>One or two correct choices and one incorrect choice.</p>	<p>Only incorrect choices.</p> <p>Two or more incorrect choices with some correct choices.</p>

Problem 3a		 Standards: MA.8.AR.2.1, MTR.4.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: Responses vary. Liam subtracted $12x$ from each side.</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response includes "Subtracted 12 from each side."</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response includes "Liam combined the $12x$ and $20x$."</p> <p>E.g., Response includes "Liam got rid of the $12x$."</p>	<p>Response shows limited understanding.</p>

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

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

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

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

Problem 5a		Standard: MA.8.AR.2.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation. $d = \frac{2}{3}$ (or equivalent). <i>Work varies.</i> $1d + 12 = 14 - 2d$ $1d = 2 - 2d$ $3d = 2$ $d = \frac{2}{3}$</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write $d = \frac{3}{2}$ may have made an error solving $3d = 2$ for d.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write -26 may have added like terms on each side of the equation.</p>	<p>Response shows limited understanding.</p>

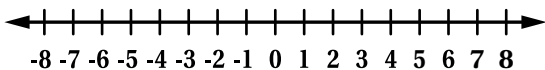
Problem 5b		Standard: MA.8.AR.2.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation. $r = 2$. <i>Work varies.</i> $\frac{1}{2}(8r + 24) = 10r$ $8r + 24 = 20r$ $24 = 12r$ $2 = r$</p>	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write $r = 4$ may have only distributed the $\frac{1}{2}$ to the first term in the parentheses.</p>	<p>Response shows limited understanding.</p>

Problem 5c			Standard: MA.8.AR.2.1
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p>$x = -4$. <i>Work varies.</i></p> <p>$-2(5 + x) - 1 = 3(x + 3)$</p> <p>$-10 - 2x - 1 = 3x + 9$</p> <p>$-11 - 2x = 3x + 9$</p> <p>$-2x = 3x + 20$</p> <p>$-5x = 20$</p> <p>$x = -4$</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write $x = 4$ may have solved the equation correctly, but forgot the negative.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write $x = -\frac{17}{5}$ may have distributed the -2 to all of the terms on the left side of the equation.</p>	<p>Response shows limited understanding.</p>

End-of-Unit Assessment

Unit 4

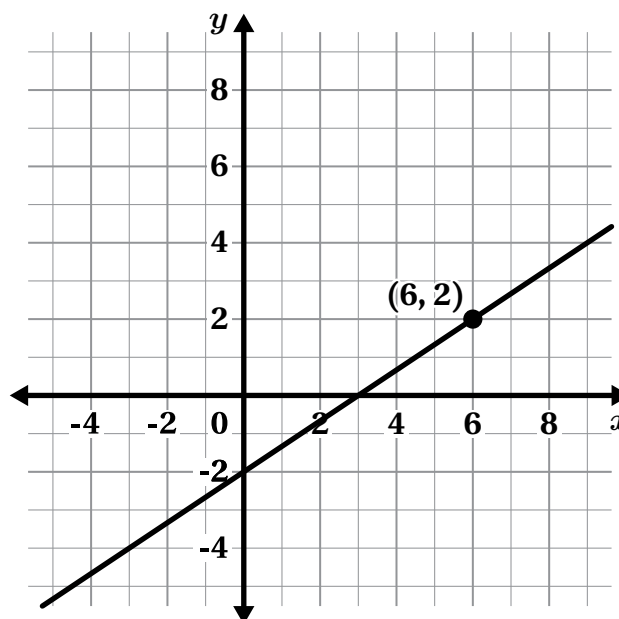
1. Solve $4(3 - x) < -4$ and graph the solution on the number line.



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. $y = 3x + 1$ | B. $y = 3x + 1$ | C. $y = x + 10$ | D. $y = -x + 10$ |
| $y = -3x + 7$ | $y = 3x + 7$ | $y = x + 10$ | $y = -x + 12$ |

Explain your thinking.

End-of-Unit Assessment (continued)**Unit 4**

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) .

$$y = -3x + 18$$

$$y = 7x - 2$$

End-of-Unit Assessment (continued)

Unit 4

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.

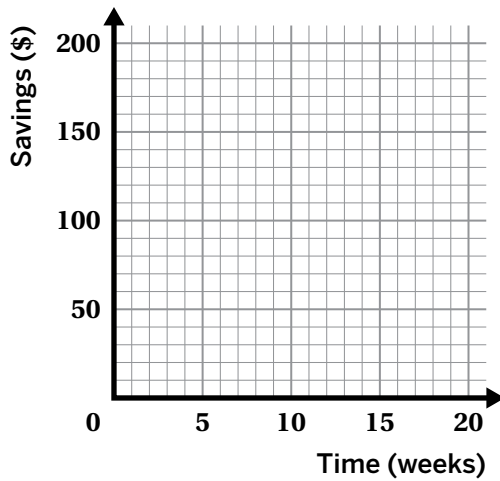
Ari Kiri They saved the same amount

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.



End-of-Unit Assessment (continued)**Unit 4**

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
<p>Correct response:</p> <p>$x > 4$</p> <p>Graph shows an open circle at 4 with a ray pointing to the right.</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Solution is $x < 4$. Graph shows an open circle at 4 with a ray pointing to the left.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Solution is $x = 4$. Graph shows an open circle at 4.</p>	<p>Response shows limited understanding.</p>

Problem 2		Standards: MA.8.AR.4.1, MTR.5.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice:</p> <p>$y = \frac{1}{2}x - 1$</p>			<p>Incorrect choice.</p> <p>Students who select $y = -\frac{3}{2}x + 6$ may have drawn the line, but used a slope of $-\frac{2}{3}$.</p> <p>Students who select $y = 4x - 2$ may have noticed that the point (2, 6) is on the line.</p>

Problem 3				Standard: MA.8.AR.4.2
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct choice and complete explanation.</p> $y = 3x + 1$ $y = -3x + 7$ <p><i>Explanations vary.</i> 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.</p>	<p>Correct response with minor flaws in explanation.</p> <p>E.g., Response includes either explanation of why the lines are not parallel or not the same line but not both.</p> <p>Incorrect response with logical and complete explanation.</p>	<p>Correct response with incomplete explanation.</p> <p>E.g., Response includes “because the equations are different.”</p> <p>Incorrect response with explanation that shows partial understanding.</p> <p>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.</p>	<p>Incorrect response with no explanation.</p>	

Problem 4a				Standard: MA.8.AR.2.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response:</p> <p>One solution: $x = \frac{1}{2}$ (or equivalent)</p>	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>	

Problem 4b				Standard: MA.8.AR.2.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response:</p> <p>Infinitely many solutions</p>	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>	

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

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

Problem 6a				Standard: MA.8.AR.3.3
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response and complete explanation.</p> <p><i>Ari. Explanations vary. Ari has \$120 because $120 = 100 + 4 \cdot 5$. Kiri has \$80 because $80 = 40 + 4 \cdot 10$.</i></p>	<p>Correct response with minor flaws in explanation.</p> <p>E.g., Response includes minor arithmetic errors.</p> <p>Incorrect response with logical and complete explanation.</p> <p>E.g., Students who select <i>Kiri</i> but correctly calculate Ari and Kiri's savings.</p>	<p>Correct response with incomplete explanation.</p> <p>E.g., Response includes "Ari saves more."</p> <p>Incorrect response with explanation that shows partial understanding.</p>	<p>Incorrect response with no explanation.</p>	

Problem 6b				Standard: MA.8.AR.3.3
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response and complete explanation.</p> <p><i>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 $n = 12$.</i></p>	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write "6 weeks" may have determined how many weeks until Kiri has \$100.</p>	<p>Response shows limited understanding.</p>	

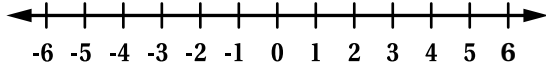
Problem 7a			Standard: MA.8.AR.4.3
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct responses:</p> <ul style="list-style-type: none"> • (1, 3) • (8, 24) • (5, 15) • (3, 9) 	<p>Response shows conceptual understanding with minor errors.</p> <p>Three correct responses.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Two correct responses.</p>	<p>Response shows limited understanding.</p> <p>Students who write 11 strawberries for 8 apples may have used addition instead of multiplication.</p> <p>One correct response.</p>

Problem 7b			Standard: MA.8.AR.4.3
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p>4 pounds of strawberries, 8 pounds of apples. <i>Explanations vary.</i> 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 $y = 8$.</p>	<p>Correct response with minor flaws in explanation.</p> <p>Incorrect response with logical and complete explanation.</p> <p>E.g., Response includes minor arithmetic errors.</p>	<p>Correct response with incomplete explanation.</p> <p>Incorrect response with explanation that shows partial understanding.</p> <p>E.g., Response includes some correct solving steps, such as substituting $y = 2x$ into the other equation.</p>	<p>Incorrect response with no explanation.</p>

End-of-Unit Assessment

Unit 4

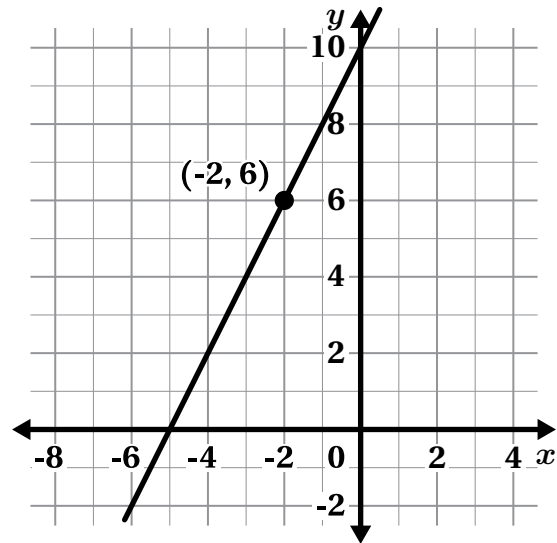
1. Solve $-3(x + 2) \geq -12$ and graph the solution on the number line.



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. $y = -x + 3$ | B. $y = -2x + 3$ | C. $y = -2x + 3$ | D. $y = x + 3$ |
| $y = -x + 9$ | $y = 2x + 9$ | $y = -2x + 9$ | $y = x + 3$ |

Explain your thinking.

End-of-Unit Assessment (continued)**Unit 4**

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) .

$$y = 5x - 6$$

$$y = -3x + 18$$

End-of-Unit Assessment (continued)

Unit 4

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

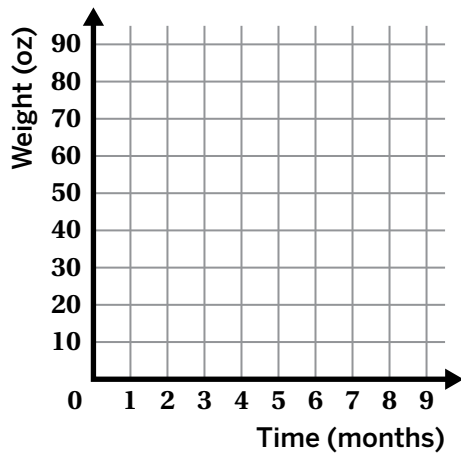
The kitten

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.



End-of-Unit Assessment (continued)**Unit 4**

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
<p>Correct response:</p> <p>$x \leq 2$</p> <p>Graph shows a closed circle at 2 with a ray pointing to the left.</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Solution is $x \geq 2$. Graph shows a closed circle at 2 with a ray pointing to the right.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Solution is $x = 2$. Graph shows a closed circle at 2.</p>	<p>Response shows limited understanding.</p>

Problem 2		Standards: MA.8.AR.4.1, MTR.5.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice:</p> <p>$y = x + 8$</p>			<p>Incorrect choice.</p> <p>Students who select $y = -2x + 6$ may have noticed that the equation contains the values -2 and 6.</p> <p>Students who select $y = 2x - 10$ may have thought they could add -4 and 10.</p>

Problem 3			Standard: MA.8.AR.4.2
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> $y = -2x + 3$ $y = 2x + 9$ <p><i>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.</i></p>	<p>Correct response with minor flaws in explanation.</p> <p>E.g., Response includes either explanation of why the lines are not parallel or not the same line but not both.</p> <p>Incorrect response with logical and complete explanation.</p>	<p>Correct response with incomplete explanation.</p> <p>E.g., Response includes "because the equations are different."</p> <p>Incorrect response with explanation that shows partial understanding.</p> <p>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.</p>	<p>Incorrect response with no explanation.</p>

Problem 4a			Standard: MA.8.AR.2.1
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>One solution:</p> $x = -\frac{7}{4} \text{ (or equivalent)}$	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>

Problem 4b			Standard: MA.8.AR.2.1
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>No solution</p>	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>

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

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

Problem 6a			Standard: MA.8.AR.3.3
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p>The puppy. <i>Explanations vary. The puppy would weigh 35 ounces because $25 + 5 \cdot 2 = 35$. The kitten would weigh 30 ounces because $10 + 10 \cdot 2 = 30$.</i></p>	<p>Correct response with minor flaws in explanation.</p> <p>E.g., Response includes minor arithmetic errors.</p> <p>Incorrect response with logical and complete explanation.</p> <p>E.g., Students who select <i>The kitten</i> but correctly calculate the growth of the puppy and the kitten.</p>	<p>Correct response with incomplete explanation.</p> <p>E.g., Response includes “The puppy weighs more.”</p> <p>Incorrect response with explanation that shows partial understanding.</p>	<p>Incorrect response with no explanation.</p>

Problem 6b			Standard: MA.8.AR.3.3
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p>3 months. <i>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 $m = 3$</i></p>	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write “1.5 months” may have determined how many weeks until the kitten weighs 25 ounces.</p>	<p>Response shows limited understanding.</p>

Problem 7a			Standard: MA.8.AR.4.3
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct responses:</p> <ul style="list-style-type: none"> • (9, 2) • (6, 4) • (0, 8) • (12, 0) 	<p>Response shows conceptual understanding with minor errors.</p> <p>Three correct responses.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Two correct responses.</p>	<p>Response shows limited understanding.</p> <p>Responses whose rows sum to 48 may not have considered the price per pound for each fruit.</p> <p>One correct response.</p>

Problem 7b			Standard: MA.8.AR.4.3
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p>3 pounds of apples and 6 pounds of strawberries. <i>Explanations vary.</i> 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 $y = 6$.</p>	<p>Correct response with minor flaws in explanation.</p> <p>Incorrect response with logical and complete explanation.</p> <p>E.g., Response includes minor arithmetic errors.</p>	<p>Correct response with incomplete explanation.</p> <p>Incorrect response with explanation that shows partial understanding.</p> <p>E.g., Response includes some correct solving steps, such as substituting $y = 2x$ into the other equation.</p>	<p>Incorrect response with no explanation.</p>

Unit 4

**Show What You
Know PDFs**

Show What You Know**4.01**

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.

Show What You Know**4.02**

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

Show What You Know**4.03**

Solve each equation. Show your thinking.

a $3x - 5 = \frac{1}{2}x$

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

Show What You Know



4.04

Andrea is comparing the costs of printing p pages at home and at a store.

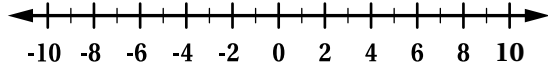
She writes the equation $100 + 0.05p = 0.25p$ based on this information:

- 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?

Show What You Know**4.05**

Solve the inequality $-\frac{1}{2}(x - 2) \leq 3$ and graph the solution. Show your work.



Show What You Know



4.06

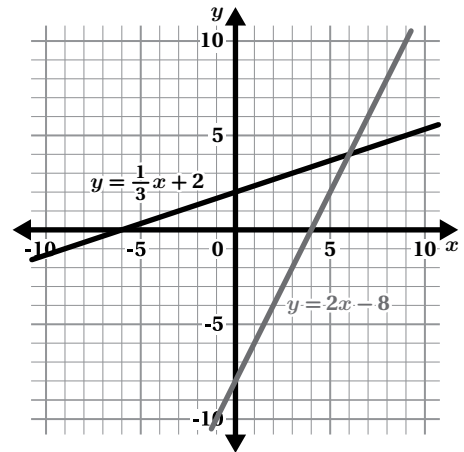
This graph represents two relationships.

- a** What is a combination of values that makes both relationships true?

<i>x</i> -value	<i>y</i> -value

- b** What is a combination of values that makes one relationship true but not the other?

<i>x</i> -value	<i>y</i> -value



Show What You Know



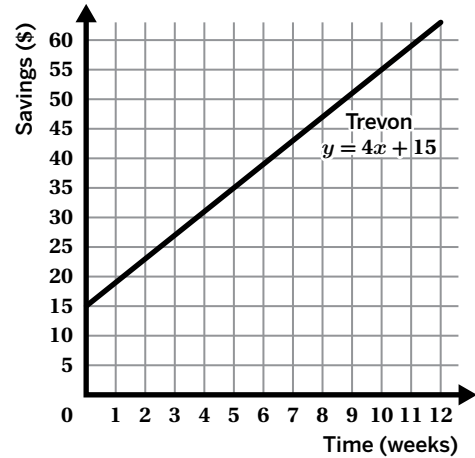
4.07

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.

- Graph a line to represent Amanda's savings.
- Explain what the intersection point of the lines means in this situation.



Show What You Know

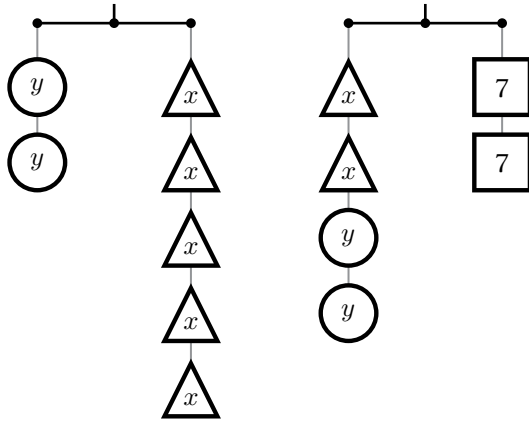


4.08

Determine the solution to this system of equations:

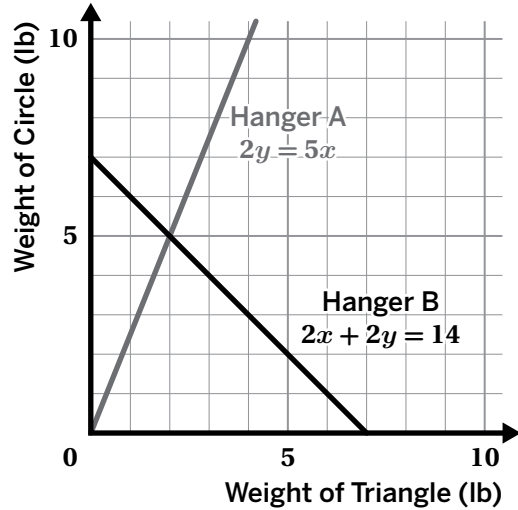
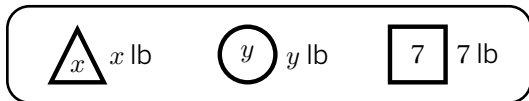
$$2y = 5x$$

$$2x + 2y = 14$$



Hanger A
 $2y = 5x$

Hanger B
 $2x + 2y = 14$



Explain your thinking.

Show What You Know



4.09

What is the solution to this system of equations?

$$y = 2x$$

$$y = 3x - 10$$

Write your solution as an ordered pair.

Show What You Know**4.10**

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.

Show What You Know Lesson 1

Name: _____ Date: _____ Period: _____

Show What You Know  4.01

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.

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.

Grade 8 171 © Angify Education, Inc. and its licensors. Angify Distance Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 2

Name: _____ Date: _____ Period: _____

Show What You Know  4.02

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
$6x + 8 = 6x + 13$	$6x + 8 = 7x + 13$	$6x + 8 = 2(3x + 4)$

Grade 8 172 © Angify Education, Inc. and its licensors. Angify Distance Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 3

Name: _____ Date: _____ Period: _____

Show What You Know  4.03

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. $-5(x - 1) + x = 2x - 3$
 $x = \frac{3}{3}$ (or equivalent). **Work varies.**
 $-5(x - 1) + x = 2x - 3$
 $-5x + 5 + x = 2x - 3$
 $-4x + 5 = 2x - 3$
 $5 = 6x - 3$
 $8 = 6x$
 $\frac{8}{6} = x$

Grade 8 173 © Angify Education, Inc. and its licensors. Angify Distance Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 4

Name: _____ Date: _____ Period: _____

Show What You Know  4.04

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.

Grade 8 174 © Angify Education, Inc. and its licensors. Angify Distance Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 5

Name: _____ Date: _____ Period: _____

Show What You Know 4.05

Solve the inequality $-\frac{1}{2}(x - 2) \leq 3$ and graph the solution. Show your work.

Solution: $x \geq -4$.
Work varies.

$$-\frac{1}{2}(x - 2) \leq 3$$

$$-\frac{1}{2}x + 1 \leq 3$$

$$-\frac{1}{2}x \leq 2$$

$$x \geq -4$$

Grade 8 175 © Amplify Education, Inc. and its licensors. Amplify Algebra Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 6

Name: _____ Date: _____ Period: _____

Show What You Know 4.06

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

Grade 8 176 © Amplify Education, Inc. and its licensors. Amplify Algebra Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 7

Name: _____ Date: _____ Period: _____

Show What You Know 4.07

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.

Grade 8 177 © Amplify Education, Inc. and its licensors. Amplify Algebra Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 8

Name: _____ Date: _____ Period: _____

Show What You Know 4.08

Determine the solution to this system of equations:

$$2y = 5x$$

$$2x + 2y = 14$$

Hanger A
 $2y = 5x$

Hanger B
 $2x + 2y = 14$

$\triangle = 1\text{ lb}$ $\circ = 1\text{ lb}$ $\square = 7\text{ lb}$


(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.

Grade 8 178 © Amplify Education, Inc. and its licensors. Amplify Algebra Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 9

Name: _____ Date: _____ Period: _____

Show What You Know  4.09

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.*

$$2x = 3x - 10$$


$$-x = -10 \qquad y = 2(10)$$

$$x = 10 \qquad y = 20$$

Grade 8 179 © Angify Education, Inc. and its licensors. Angify Education Math is based on content from Illustrative Mathematics (IM) and Open Up Resources.

Show What You Know Lesson 10

Name: _____ Date: _____ Period: _____

Show What You Know  4.10

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.
Explanations vary. The graphs of these equations will have the same slope but different y-intercepts. This means the lines will never meet.

Grade 8 180 © Angify Education, Inc. and its licensors. Angify Education Math is based on content from Illustrative Mathematics (IM) and Open Up Resources.

Unit 5

Assessments and Rubrics

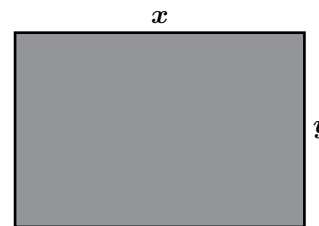
Pre-Unit Check

Unit 5

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 .

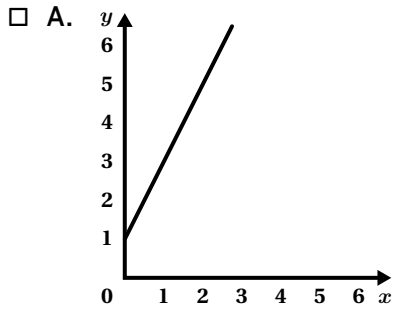
- A. $j = 2b + 3$
- B. $j = 2(b + 3)$
- C. $j = \frac{b}{2} - 3$
- D. $b = 2j + 3$
- E. $b = \frac{j - 3}{2}$
- F. $b = \frac{j}{2} - 3$

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?

Pre-Unit Check (continued)**Unit 5**

4. Select *all* the linear relationships.



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.

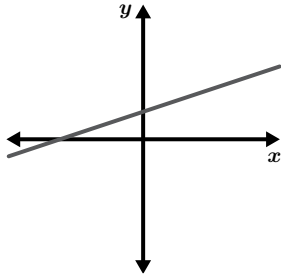
E. $y = \frac{1}{x}$

Sub-Unit Quiz

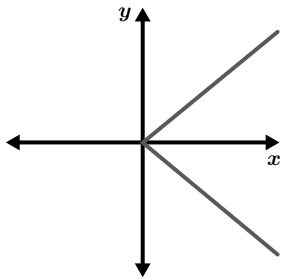
Unit 5

1. Select *all* the graphs that represent y as a function of x .

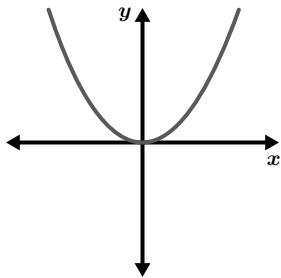
A.



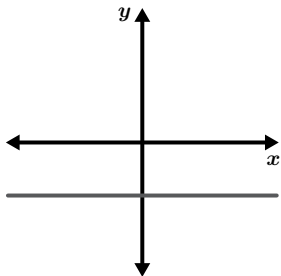
B.



C.



D.



Sub-Unit Quiz (continued)

Unit 5

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

Sub-Unit Quiz (continued)

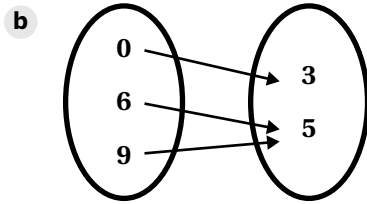
Unit 5

3. What is the domain and range of the relations below?

a $\{(4, 8), (7, 9), (12, 1)\}$

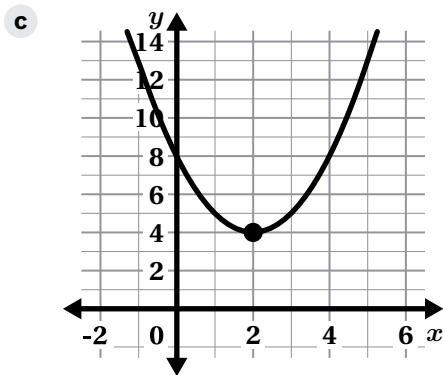
Domain:

Range:



Domain:

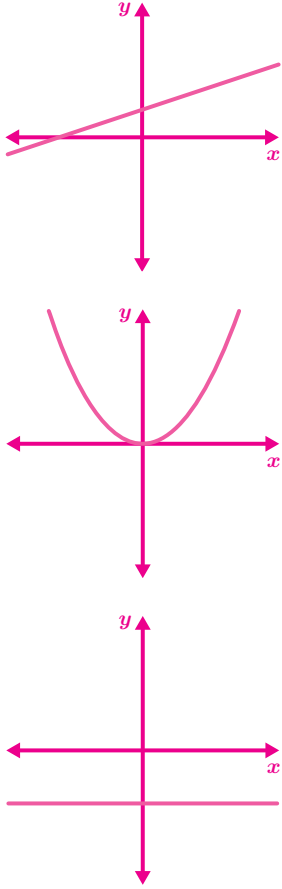
Range:



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
<p>All correct choices and no incorrect choices.</p> 	<p>One or two correct choices and no incorrect choices.</p> <p>All correct choices and one incorrect choice.</p>	<p>One or two correct choices and one incorrect choice.</p>	<p>Only incorrect choices.</p> <p>Two or more incorrect choices with some correct choices.</p>

Problem 2a			
Standards: MA.8.F.1.1, MTR.7.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p><i>Yes. Explanations vary.</i></p> <ul style="list-style-type: none"> • 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. 	<p>Correct response with minor flaws in explanation.</p> <p>E.g., Response includes "Yes, because the more books he prints, the higher the total cost."</p> <p>Incorrect response with logical and complete explanation.</p>	<p>Correct response with incomplete explanation.</p> <p>Incorrect response with explanation that shows partial understanding.</p>	<p>Incorrect response with no explanation.</p>

Problem 2b			
Standards: MA.8.F.1.1, MTR.7.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p><i>Yes. Explanations vary.</i></p> <ul style="list-style-type: none"> • 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. 	<p>Correct response with minor flaws in explanation.</p> <p>E.g., Response includes "Yes, because the higher the total cost, the more books he will get."</p> <p>Incorrect response with logical and complete explanation.</p>	<p>Correct response with incomplete explanation.</p> <p>Incorrect response with explanation that shows partial understanding.</p>	<p>Incorrect response with no explanation.</p>

Problem 2c		Standards: MA.8.F.1.1, MTR.7.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>Independent variable: Books printed, b</p> <p>Dependent variable: Total cost, c</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Incomplete identification, such as independent variable is books and dependent variable is cost.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., One variable is correctly identified.</p> <p>E.g., Variables are swapped.</p>	<p>Response shows limited understanding.</p> <p>E.g., Student does not mention “books printed, b” or “total cost, c” at all.</p>

Problem 3a			
Standards: MA.8.F.1.1, MTR.2.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: Domain: 4, 7, 12 Range: 1, 8, 9</p>	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>

Problem 3b			
Standards: MA.8.F.1.1, MTR.2.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: Domain: 0, 6, 9 Range: 3, 5</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Correct response but includes 5 twice in the range.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>

Problem 3c			
Standards: MA.8.F.1.1, MTR.2.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: Domain: $-\infty < x < \infty$ Range: $y \geq 4$</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Correct response but uses strict inequality for range.</p> <p>E.g., Correct response but uses inclusive inequality for domain.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Limits domain to visual curve, including endpoint values for domain.</p> <p>E.g., Includes all real values for the range.</p>	<p>Response shows limited understanding.</p>

End-of-Unit Assessment

Unit 5

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.

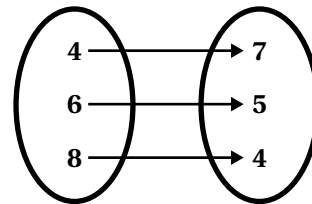
2. Determine whether each function is linear or nonlinear. Write linear or nonlinear in the blank under each representation.

a

x	y
0	6
4	6
8	6

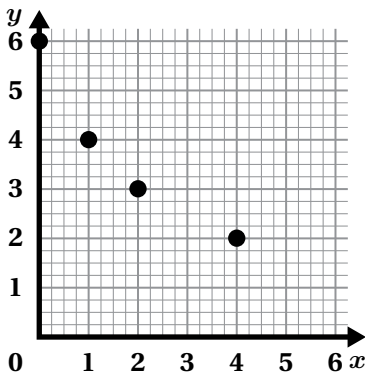
.....

b



.....

c



.....

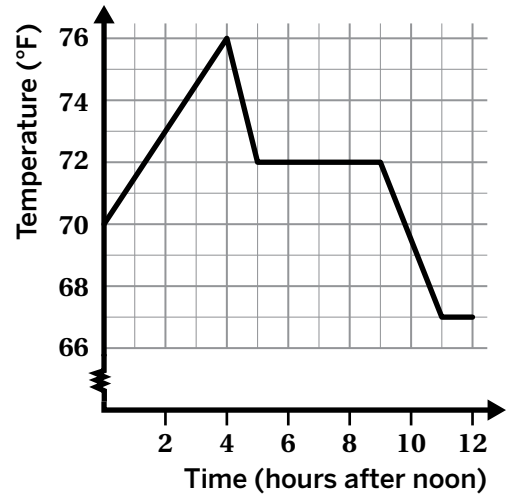
End-of-Unit Assessment (continued)

Unit 5

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?

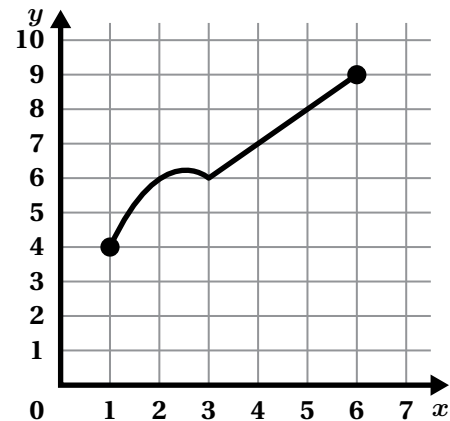
$\{(3, 5), (6, 9), (7, 9)\}$

Domain: Range:

b What is the domain and range for the given graph?

Domain:

Range:



End-of-Unit Assessment (continued)**Unit 5**

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

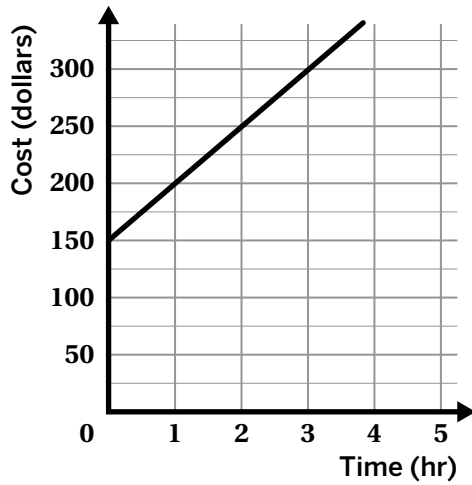
Explain your thinking.

End-of-Unit Assessment (continued)

Unit 5

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
<p>Correct choice:</p> <p>Decreasing at 2 gallons per minute.</p>			<p>Incorrect choice.</p> <p>Students who select <i>Increasing at 2 gallons per minute</i> may have calculated the correct rate but interpreted it incorrectly as an increase.</p>

Problem 2a  Standards: MA.8.F.1.2, MTR.2.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>linear</p>			<p>Response shows limited understanding.</p>


Problem 2b  Standards: MA.8.F.1.2, MTR.2.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>nonlinear</p>		<p>understanding with significant errors.</p>	<p>Response shows limited understanding.</p>


Problem 2c  Standards: MA.8.F.1.2, MTR.2.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>nonlinear</p>		<p>understanding with significant errors.</p>	<p>Response shows limited understanding.</p>


Problem 3 Standard: MA.8.F.1.3, MTR.7.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <ul style="list-style-type: none"> The temperature was 74° twice during this time. There was a four-hour period during which the temperature did not change. 	<p>One correct choice and no incorrect choices.</p> <p>Both correct choices and one incorrect choice.</p>	<p>One correct choice and one incorrect choice.</p>	<p>Only incorrect choices.</p> <p>Two or more incorrect choices with some correct choices.</p>

Problem 4a Standards: MA.8.F.1.1, MTR.2.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>Domain: 3, 6, 7</p> <p>Range: 5, 9</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Correct response but includes 9 twice in the range.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>

Problem 4b Standards: MA.8.F.1.1, MTR.2.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>Domain: $1 \leq x \leq 6$</p> <p>Range: $4 \leq y \leq 9$</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Correct response but uses strict inequalities for domain or range.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Correct response but uses strict inequalities for both domain and range.</p>	<p>Response shows limited understanding.</p>

Problem 5a  Standard: MA.8.F.1.1, MTR.7.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p><i>Yes. Explanations vary. It is a function because there is a single output (the total points scored) for each input (the number of quarters).</i></p>	<p>Correct response with minor flaws in explanation.</p> <p>Incorrect response with logical and complete explanation.</p>	<p>Correct response with incomplete explanation.</p> <p>Incorrect response with explanation that shows partial understanding.</p> <p>E.g., Response includes “there are two outputs that are the same.”</p>	<p>Incorrect response with no explanation.</p>

Problem 5b  Standard: MA.8.F.1.2, MTR.7.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p><i>No. Explanations vary. It is not a linear relationship because the rate of change is not always the same.</i></p>	<p>Correct response with minor flaws in explanation.</p> <p>Incorrect response with logical and complete explanation.</p> <p>E.g., Response includes “Yes, because the points increase by 7 each quarter.”</p>	<p>Correct response with incomplete explanation.</p> <p>Incorrect response with explanation that shows partial understanding.</p>	<p>Incorrect response with no explanation.</p>

Problem 6a  Standards: MA.8.AR.3.5, MTR.7.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <ul style="list-style-type: none"> • Each hour: 50 dollars • One-time fee: 150 dollars <p><i>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.</i></p>	<p>Correct response with minor flaws in explanation.</p> <p>Incorrect response with logical and complete explanation.</p> <p>E.g., Response includes minor arithmetic errors.</p>	<p>Correct response with incomplete explanation.</p> <p>Incorrect response with explanation that shows partial understanding.</p> <p>E.g., Response includes the correct slope or y-intercept but not both.</p>	<p>Incorrect response with no explanation.</p>

Problem 6b			
Standards: MA.8.AR.3.5, MTR.7.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <ul style="list-style-type: none"> • Each hour: 60 dollars • One-time fee: 80 dollars <p><i>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.</i></p>	<p>Correct response with minor flaws in explanation.</p> <p>Incorrect response with logical and complete explanation.</p> <p>E.g., Response includes minor arithmetic errors.</p>	<p>Correct response with incomplete explanation.</p> <p>Incorrect response with explanation that shows partial understanding.</p> <p>E.g., Response includes the correct slope or <i>y</i>-intercept but not both.</p>	<p>Incorrect response with no explanation.</p>

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
<p>Correct response and complete explanation.</p> <p><i>Yes. Explanations vary.</i></p> <ul style="list-style-type: none"> • 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. 	<p>Correct response with minor flaws in explanation.</p> <p>Incorrect response with logical and complete explanation.</p>	<p>Correct response with incomplete explanation.</p> <p>Incorrect response with explanation that shows partial understanding.</p> <p>E.g., Response includes an accurate graph of A-Plus plumbing and concludes that they do not meet on the graph.</p>	<p>Incorrect response with no explanation.</p>

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:

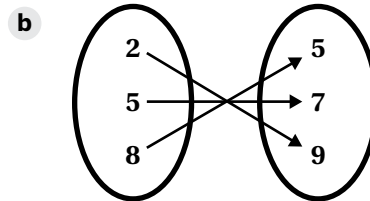
- A. Increasing by 3 dollars per month.
- B. Increasing by 9 dollars per month.
- C. Decreasing by 3 dollars per month.
- D. Decreasing by 9 dollars per month.

2. Determine whether each function is linear or nonlinear.

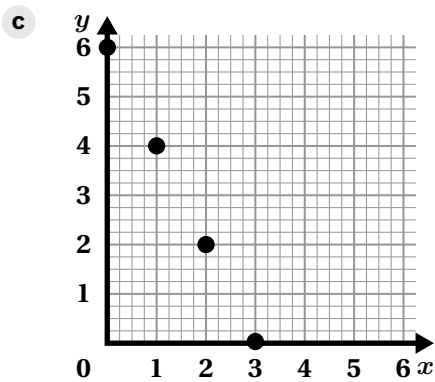
a

x	y
0	0
3	6
6	24

.....



.....

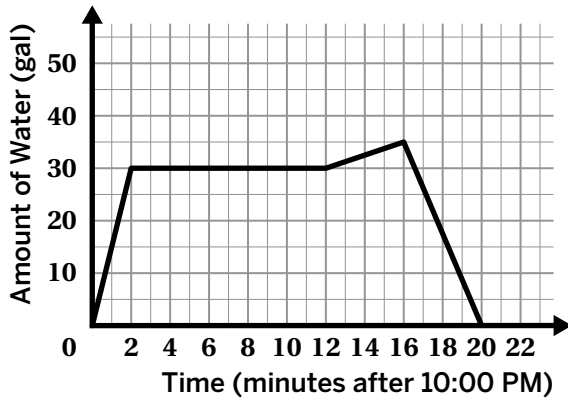


.....

End-of-Unit Assessment (continued)

Unit 5

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

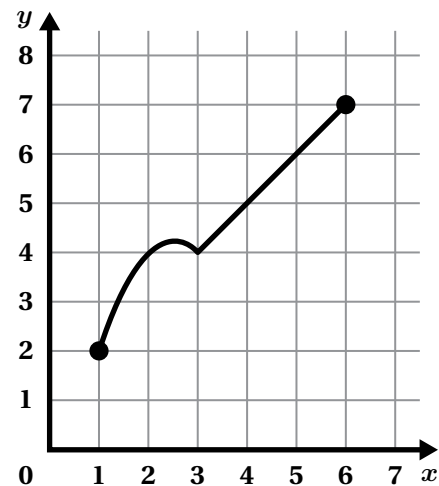
$$\{(5,8),(3,7),(0,8)\}$$

Domain: Range:

b What is the domain and range for the given graph?

Domain:

Range:



End-of-Unit Assessment (continued)

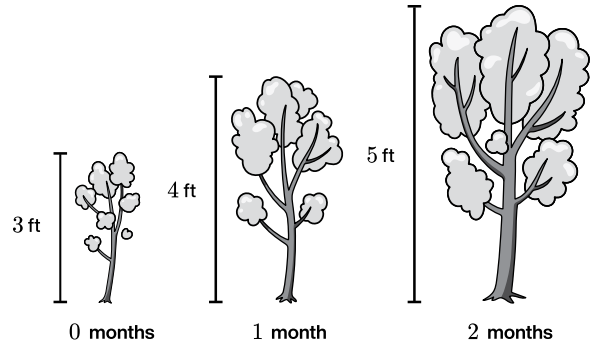
Unit 5

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

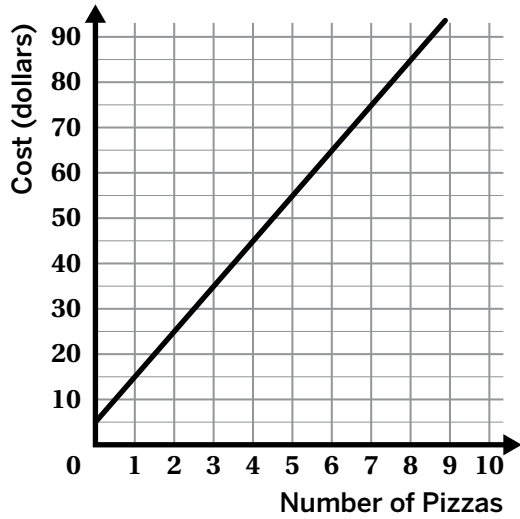
Explain your thinking.

End-of-Unit Assessment (continued)

Unit 5

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
<p>Correct choice:</p> <p>Increasing by 3 dollars per month.</p>			<p>Incorrect choice.</p> <p>Students who select <i>Increasing by 9 dollars per month</i> may have correctly interpreted the change between rows but not the rate of change.</p>

Problem 2a  Standards: MA.8.F.1.2, MTR.2.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>nonlinear</p>			<p>Response shows limited understanding.</p>

Problem 2b  Standards: MA.8.F.1.2, MTR.2.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>linear</p>		<p>understanding with significant errors.</p>	<p>Response shows limited understanding.</p>

Problem 2c  Standards: MA.8.F.1.2, MTR.2.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>linear</p>			<p>Response shows limited understanding.</p>

Problem 3 Standard: MA.8.F.1.3, MTR.7.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>All correct choices and no incorrect choices.</p> <ul style="list-style-type: none"> 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. 	<p>One or two correct choices and no incorrect choices.</p> <p>All correct choices and one incorrect choice.</p>	<p>One or two correct choices and one incorrect choice.</p>	<p>Only incorrect choices.</p> <p>Two or more incorrect choices with some correct choices.</p>

Problem 4a Standards: MA.8.F.1.1, MTR.2.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>Domain: 3, 5, 0</p> <p>Range: 7, 8</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Correct response but includes 8 twice in the range.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>

Problem 4b Standards: MA.8.F.1.1, MTR.2.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>Domain: $1 \leq x \leq 6$</p> <p>Range: $2 \leq y \leq 7$</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Correct response but uses strict inequalities for domain or range.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Correct response but uses strict inequalities for both domain and range.</p>	<p>Response shows limited understanding.</p>

Problem 5a Standard: MA.8.F.1.1, MTR.7.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p><i>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).</i></p>	<p>Correct response with minor flaws in explanation.</p> <p>E.g., Response includes “Yes, because the tree gets taller each month.”</p> <p>Incorrect response with logical and complete explanation.</p>	<p>Correct response with incomplete explanation.</p> <p>Incorrect response with explanation that shows partial understanding.</p>	<p>Incorrect response with no explanation.</p>

Problem 5b Standard: MA.8.F.1.2, MTR.7.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p><i>Yes. Explanations vary. It is linear because the growth rate of 1 foot per month is a constant rate of change.</i></p>	<p>Correct response with minor flaws in explanation.</p> <p>Incorrect response with logical and complete explanation.</p>	<p>Correct response with incomplete explanation.</p> <p>E.g., Response includes “Yes, because the tree grows by one foot.”</p> <p>Incorrect response with explanation that shows partial understanding.</p>	<p>Incorrect response with no explanation.</p>

Problem 6a Standards: MA.8.AR.3.5, MTR.7.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <ul style="list-style-type: none"> • Cost for each pizza: 10 dollars • Delivery fee: 5 dollars <p><i>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.</i></p>	<p>Correct response with minor flaws in explanation.</p> <p>Incorrect response with logical and complete explanation.</p> <p>E.g., Response includes minor arithmetic errors.</p>	<p>Correct response with incomplete explanation.</p> <p>Incorrect response with explanation that shows partial understanding.</p> <p>E.g., Response includes the correct slope or y-intercept but not both.</p>	<p>Incorrect response with no explanation.</p>

Problem 6b		Standards: MA.8.AR.3.5, MTR.7.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <ul style="list-style-type: none"> • Each pizza: 8 dollars • Delivery fee: 13 dollars <p><i>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.</i></p>	<p>Correct response with minor flaws in explanation.</p> <p>Incorrect response with logical and complete explanation.</p> <p>E.g., Response includes minor arithmetic errors.</p>	<p>Correct response with incomplete explanation.</p> <p>Incorrect response with explanation that shows partial understanding.</p> <p>E.g., Response includes the correct slope or <i>y</i>-intercept but not both.</p>	<p>Incorrect response with no explanation.</p>

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
<p>Correct response and complete explanation.</p> <p><i>Yes. Explanations vary.</i></p> <ul style="list-style-type: none"> • 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. 	<p>Correct response with minor flaws in explanation.</p> <p>Incorrect response with logical and complete explanation.</p>	<p>Correct response with incomplete explanation.</p> <p>Incorrect response with explanation that shows partial understanding.</p>	<p>Incorrect response with no explanation.</p>

Unit 5

**Show What You
Know PDFs**

Show What You Know**5.01**

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

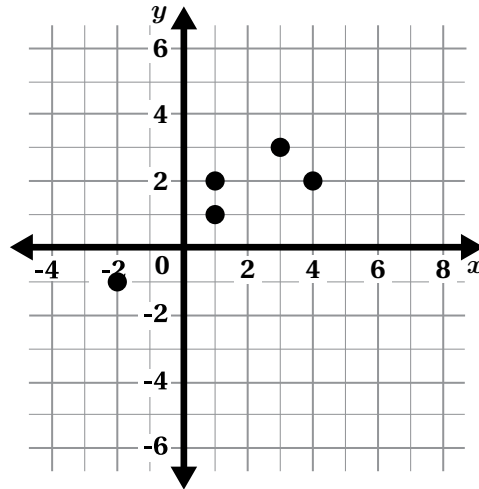
Input	Output
Daisy	April 1
Daisy	April 8
Rose	June 5
Carnation	January 23
Holly	December 25

Table B

Input	Output
April 1	Daisy
April 8	Daisy
June 5	Rose
January 23	Carnation
December 25	Holly

Show What You Know**5.02**

What is the domain and range of the relation shown? Express your answers as a bracketed list of elements.

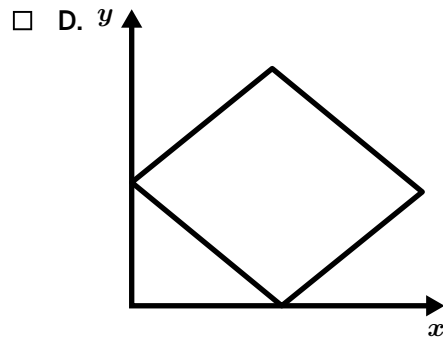
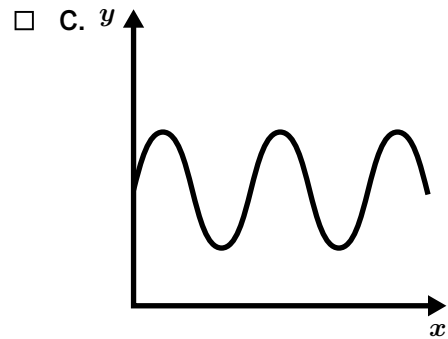
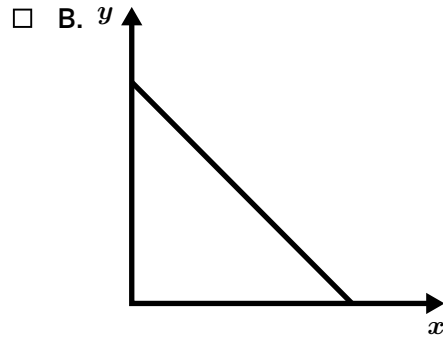
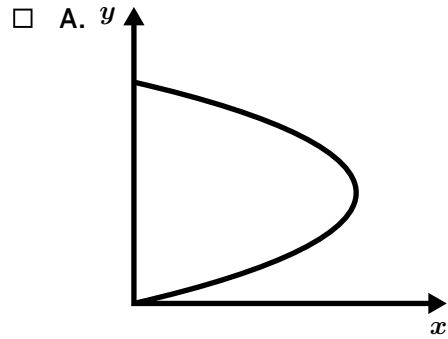


Show What You Know



5.03

Select *all* the graphs that represent a function.



Show What You Know**5.04**

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:

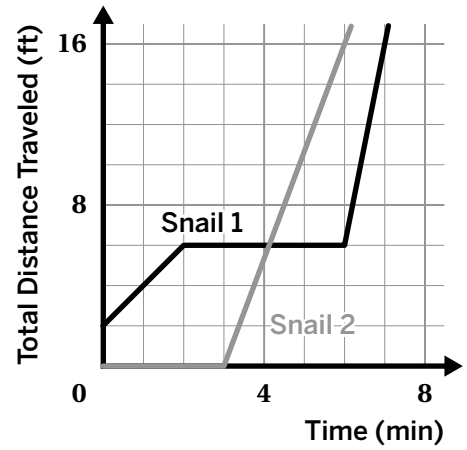
Explain your thinking.

Show What You Know



5.05

Two snails competed in a 16-foot race.
 The graph shows their distance vs. time relationships.
 Write a story based on the graph.



Show What You Know



5.06

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.

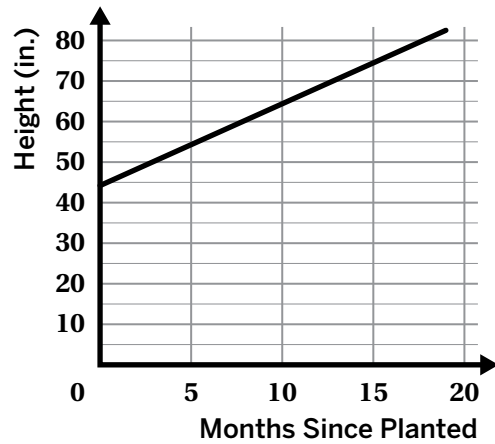
Show What You Know



5.07

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.

Show What You Know Lesson 1

Name: _____ Date: _____ Period: _____

Show What You Know 5.01

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.

Input	Output
Daisy	April 1
Daisy	April 8
Rose	June 5
Carnation	January 23
Holly	December 25

Input	Output
April 1	Daisy
April 8	Daisy
June 5	Rose
January 23	Carnation
December 25	Holly

Grade 8 217 © Angify Education, Inc. and its licensors. Angify District Math is based on content from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 2

Name: _____ Date: _____ Period: _____

Show What You Know 5.02

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 = $\{-1, 1, 2, 3\}$

Grade 8 218 © Angify Education, Inc. and its licensors. Angify District Math is based on content from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 3

Name: _____ Date: _____ Period: _____

Show What You Know 5.03

Select all the graphs that represent a function.

A.

B.

C.

D.

Grade 8 219 © Angify Education, Inc. and its licensors. Angify District Math is based on content from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 4

Name: _____ Date: _____ Period: _____

Show What You Know 5.04

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.

Grade 8 220 © Angify Education, Inc. and its licensors. Angify District Math is based on content from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 5

Name: _____ Date: _____ Period: _____

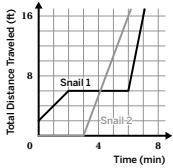
Show What You Know 5.05

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.



Grade 8 221 © Amplify Education, Inc. and its licensors. Amplify Essential Math is based on work from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 6

Name: _____ Date: _____ Period: _____

Show What You Know 5.06

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.

Grade 8 222 © Amplify Education, Inc. and its licensors. Amplify Essential Math is based on work from Illustrative Mathematics (IM) and OpenUp Resources.

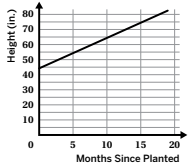
Show What You Know Lesson 7

Name: _____ Date: _____ Period: _____

Show What You Know 5.07

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.

Grade 8 223 © Amplify Education, Inc. and its licensors. Amplify Essential Math is based on work from Illustrative Mathematics (IM) and OpenUp Resources.

Unit 6

Assessments and Rubrics

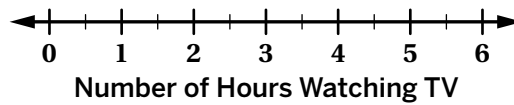
Pre-Unit Check

Unit 6

1. A survey asked 10 people how many hours they spent watching TV last night. Here are their responses.

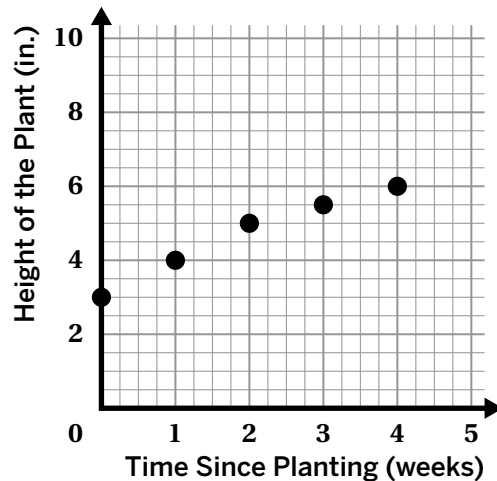
0	4.5	2	3	2	2.5	3	0	2	4
---	-----	---	---	---	-----	---	---	---	---

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.



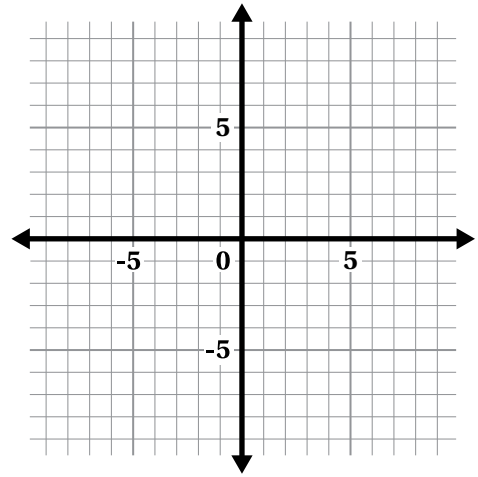
Pre-Unit Check (continued)

Unit 6

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.

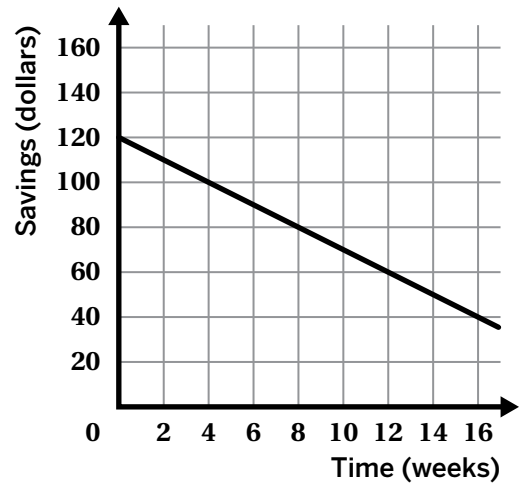


- b Calculate the slope of the line.

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?

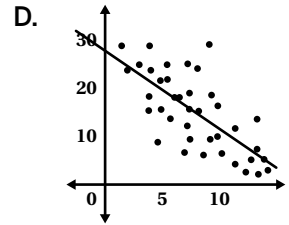
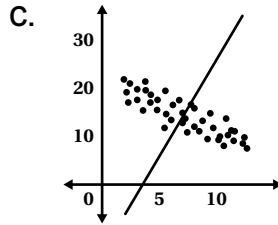
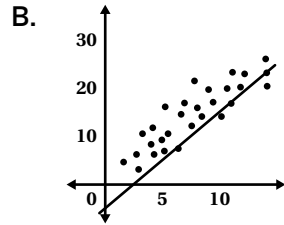
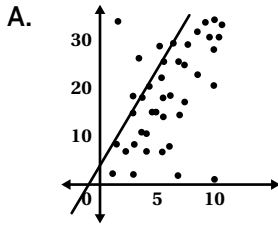


- c What does the vertical intercept represent in this situation?

Sub-Unit Quiz

Unit 6

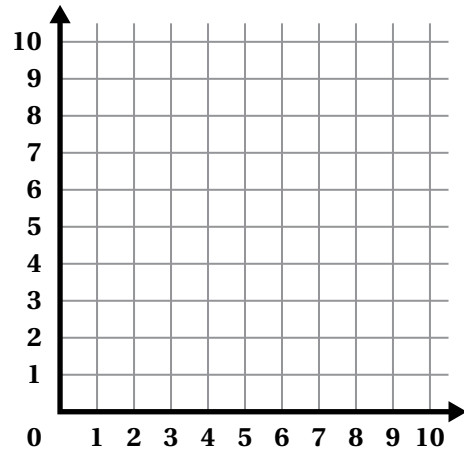
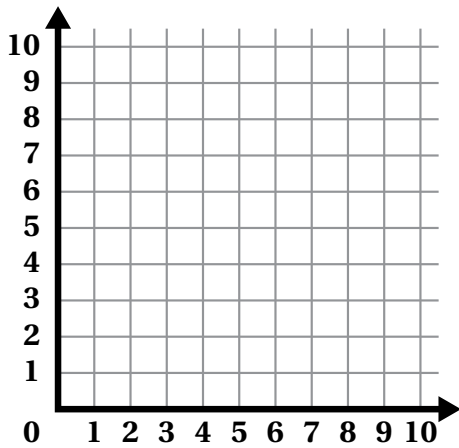
1. Select the scatter plot with the best line of fit.



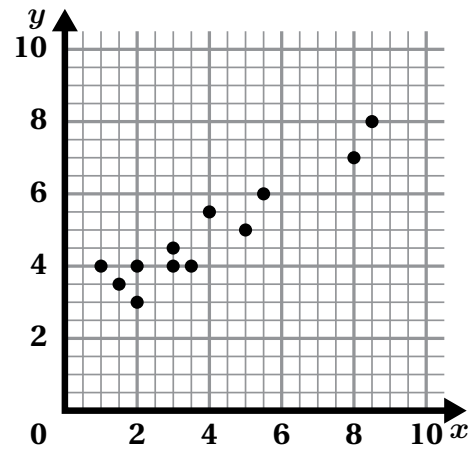
2. Draw two scatter plots.

- 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.



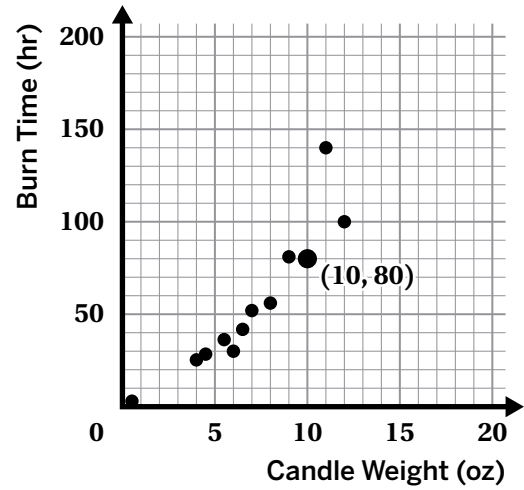
Sub-Unit Quiz (continued)

Unit 6

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:

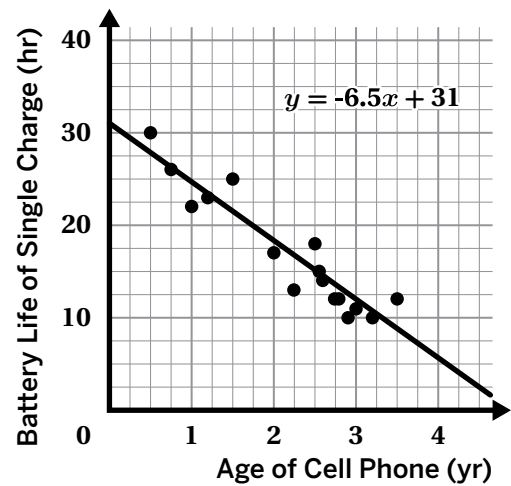
The heaviest candle that takes less than 100 hours to burn.



5. This scatter plot shows the age of used cell phones and their battery life on a single charge.

- a Select *all* the terms that describe the association.

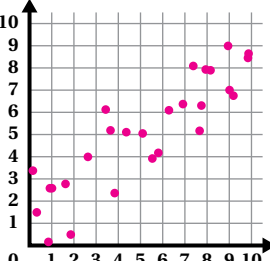
<input type="checkbox"/> Positive	<input type="checkbox"/> Linear
<input type="checkbox"/> Negative	<input type="checkbox"/> Non-linear
<input type="checkbox"/> Weak	<input type="checkbox"/> Strong
- b What is the value of the slope? What does it mean in this situation?

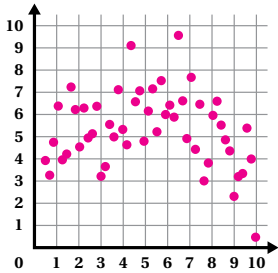


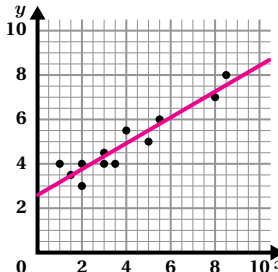
- c There is a cell phone that is 4 years old. Use the linear model to predict its battery life on a single charge.

Standard	MA.8.DP.1.1	MA.8.DP.1.2	MA.8.DP.1.3	MA.8.AR.3.5
Problem(s)	2, 4c	4a, 4b, 5a	1, 3, 5b, 5c	5b

Problem 1		Standard: MA.8.DP.1.3	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice:</p> 			<p>Incorrect choice.</p>

Problem 2a		Standard: MA.8.DP.1.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p><i>Responses vary.</i></p> 	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response correctly meets two constraints.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response correctly meets one constraint.</p>	<p>Response shows limited understanding.</p>

Problem 2b		Standard: MA.8.DP.1.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: <i>Responses vary.</i></p> 	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response correctly meets two constraints.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response correctly meets one constraint.</p>	<p>Response shows limited understanding.</p>

Problem 3		Standard: MA.8.DP.1.3	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: <i>Responses vary.</i></p> 	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response includes a positive slope but does not pass through the center of the data.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response includes a line but it is not a good fit for the data.</p>	<p>Response shows limited understanding.</p>

Problem 4a		Standard: MA.8.DP.1.2	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: <i>Responses vary.</i> A 10-ounce candle takes 80 hours to fully burn.</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response correctly describes one quantity.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Students who write "An 80-ounce candle takes 10 hours to fully burn" may have confused the axes.</p>	<p>Response shows limited understanding.</p>

Problem 4b		Standard: MA.8.DP.1.2	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response includes (11, 140) and another point is circled.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Student circles the left-most point that is separated from the data but is not an outlier.</p>	<p>Response shows limited understanding.</p>

Problem 4c		Standard: MA.8.DP.1.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response includes an x-coordinate greater than 12 or a y-coordinate less than 100.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response includes an x-coordinate equal to 12 and a y-coordinate equal to 100.</p>	<p>Response shows limited understanding.</p>

Problem 5a		Standard: MA.8.DP.1.2	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Both correct choices and no incorrect choices.</p> <ul style="list-style-type: none"> • Negative • Linear • Strong 	<p>One correct choice and no incorrect choices.</p> <p>Both correct choices and one incorrect choice.</p>	<p>One correct choice and one incorrect choice.</p>	<p>Only incorrect choices.</p> <p>Two or more incorrect choices with some correct choices.</p>

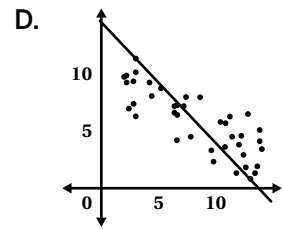
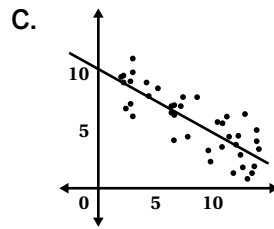
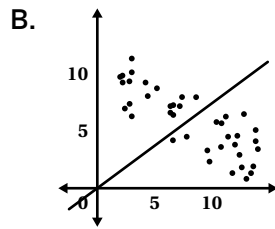
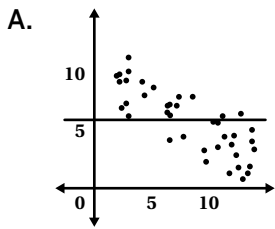
Problem 5b			
Standards: MA.8.DP.1.3, MA.8.AR.3.5, MTR.6.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p>-6.5. Explanations vary. This means that when the age of a cell phone increases by 1, the battery life on a single charge is expected to decrease by 6.5 hours.</p>	<p>Correct response with minor flaws in explanation.</p> <p>E.g., Response includes “the battery life goes down by 6.5” but does not specify the change in the age of the phone.</p> <p>Incorrect response with logical and complete explanation.</p>	<p>Correct response with incomplete explanation.</p> <p>Incorrect response with explanation that shows partial understanding.</p> <p>E.g., Response includes “the battery life decreases by 1 hour for every 6.5 years old the phone is.”</p>	<p>Incorrect response with no explanation.</p>

Problem 5c			
Standards: MA.8.DP.1.3, MTR.6.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>5 hours</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response includes an attempt to correctly substitute 4 for x in the equation but then has a minor calculation error.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Students who write 4.15 may have substituted 4 for y in the equation and then solved for x.</p>	<p>Response shows limited understanding.</p>

End-of-Unit Assessment

Unit 6

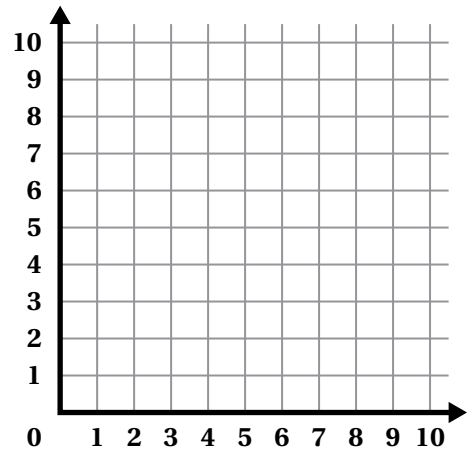
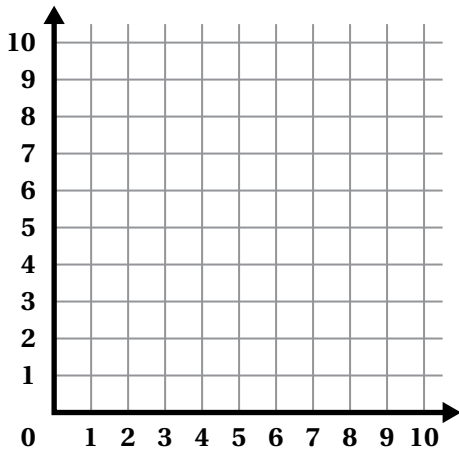
1. Select the scatter plot with the best line of fit.



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.



End-of-Unit Assessment (continued)

Unit 6

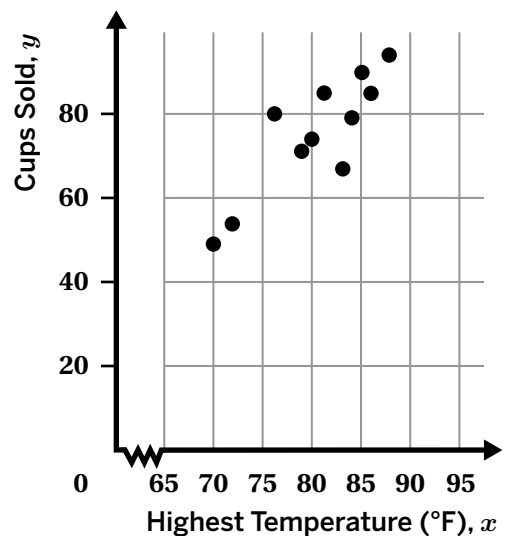
3. Select *all* the pairs of variables that have a *positive* association.

- | | |
|--|---|
| <input type="checkbox"/> A. x : Outside temperature
y : Cost to heat a home | <input type="checkbox"/> B. x : Number of people in a checkout line
y : Time you have to wait to check out |
| <input type="checkbox"/> C. x : Minutes you've walked
y : Number of steps you've walked | <input type="checkbox"/> D. x : Speed of a train
y : Time for the train to get to its destination |
| <input type="checkbox"/> E. x : Pounds of cherries you buy
y : Total cost of the cherries | |

4. 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.

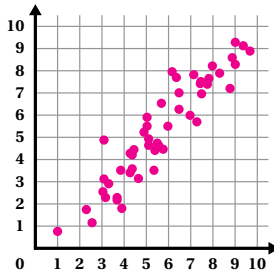
- a Sketch a linear model that is a good fit for the data.
- b Jayla made a linear model with the equation $y = 2x - 89$.

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.



Standard	MA.8.AR.3.5	MA.8.DP.1.2	MA.8.DP.1.3
Problem(s)	4c	2, 3	1, 4a, 4b, 4c

Problem 1		Standard: MA.8.DP.1.3	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice:</p> 			<p>Incorrect choice.</p>

Problem 2a		Standards: MA.8.DP.1.2, MTR.2.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p><i>Responses vary.</i></p> 	<p>Response shows conceptual understanding with minor errors.</p> <p>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.</p> <p>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.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Students who plot a negative association without outliers may need additional support with this unit's vocabulary.</p>	<p>Response shows limited understanding.</p>

Problem 2b		Standards: MA.8.DP.1.2, MTR.2.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: <i>Responses vary.</i></p>	<p>Response shows conceptual understanding with minor errors.</p> <p>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.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Students who plot a linear negative association may need additional support understanding the difference between linear and non-linear associations.</p>	<p>Response shows limited understanding.</p> <p>E.g., Students who plot a positive linear association.</p>

Problem 3		Standard: MA.8.DP.1.2	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>All correct choices and no incorrect choices.</p> <ul style="list-style-type: none"> <i>x</i>: Number of people in a checkout line <i>y</i>: Time you have to wait to check out <i>x</i>: Minutes you've walked <i>y</i>: Number of steps you've walked <i>x</i>: Pounds of cherries you buy <i>y</i>: Total cost of the cherries 	<p>One or two correct choices and no incorrect choices.</p> <p>All correct choices and one incorrect choice.</p>	<p>One or two correct choices and one incorrect choice.</p>	<p>Only incorrect choices.</p> <p>Two or more incorrect choices with some correct choices.</p>

Problem 4a		Standard: MA.8.DP.1.3	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: <i>Responses vary.</i></p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., The slope of the line generally follows the trend of the data but is shifted vertically.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., The line goes through the center of the data but does not fit the trend of the data.</p>	<p>Response shows limited understanding.</p>

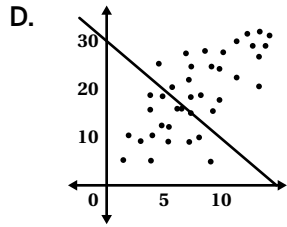
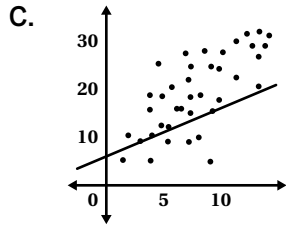
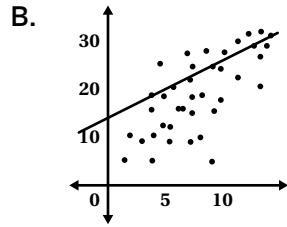
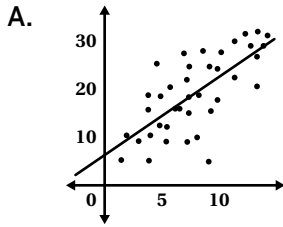
Problem 4b		Standard: MA.8.DP.1.3	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: 59 cups</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g, Students may have correctly substituted 74 for x in the equation but then made a minor calculation error.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g, Students who write 81.5 cups may have substituted 74 for y in the equation and then solved for x.</p>	<p>Response shows limited understanding.</p>

Problem 4c		Standards: MA.8.DP.1.3, MA.8.AR.3.5	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>2. Responses vary. This means that the model predicts 2 more cups of lemonade sold for every 1-degree increase in temperature.</p>	<p>Correct response with minor flaws in explanation.</p> <p>E.g., Response includes “2 more cups of lemonade are sold” but does not specify the 1-degree increase in temperature.</p> <p>Incorrect response with logical and complete explanation.</p>	<p>Correct response with incomplete explanation.</p> <p>Incorrect response with explanation that shows partial understanding.</p> <p>E.g., Response includes “For every 2-degree increase in temperature 1 more cup of lemonade is sold.”</p>	<p>Incorrect response with no explanation.</p>

End-of-Unit Assessment

Unit 6

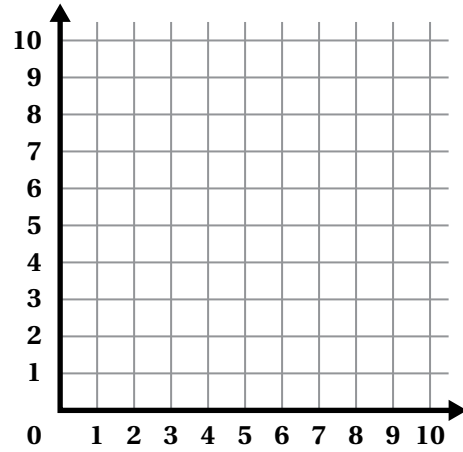
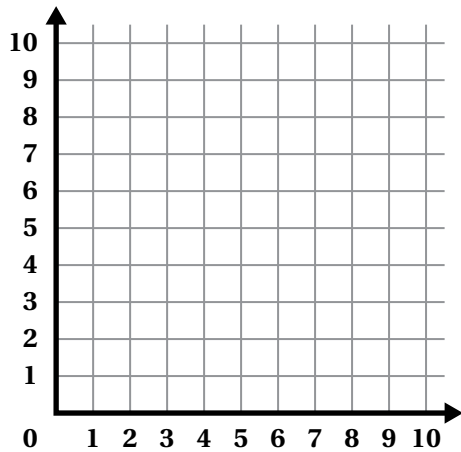
1. Select the scatter plot with the best line of fit.



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.



End-of-Unit Assessment (continued)

Unit 6

3. Select *all* the pairs of variables that have a *negative* association.

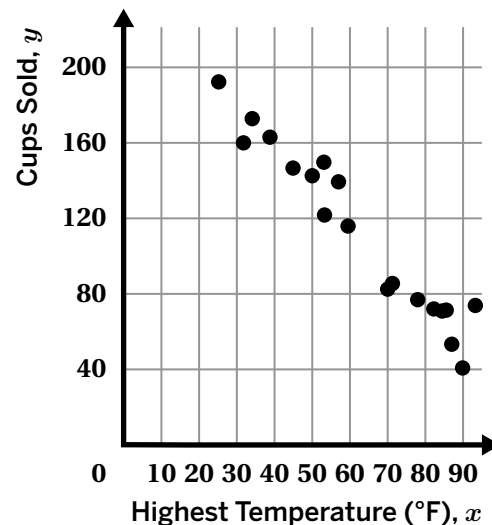
- | | |
|--|--|
| <input type="checkbox"/> A. x : Minutes you've walked
y : Number of calories burned | <input type="checkbox"/> B. x : Money in a bank account
y : Money spent from the bank account |
| <input type="checkbox"/> C. x : Number of people in a checkout line
y : Time you have to wait in the line | <input type="checkbox"/> D. x : Time working
y : Free time |
| <input type="checkbox"/> E. x : Speed that you walk
y : Time to get to your destination | |

4. 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 $y = -2x + 240$.

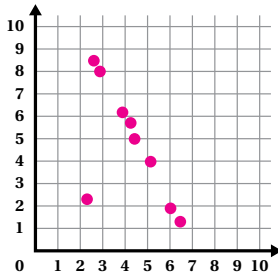
Use her equation to predict how many cups of hot chocolate Pilar might sell on a day when the highest temperature is 40°F .

- c Identify the slope of Pilar's model and describe what it means in this situation.



Standard	MA.8.AR.3.5	MA.8.DP.1.2	MA.8.DP.1.3
Problem(s)	4c	2, 3	1, 4a, 4b, 4c

Problem 1		Standard: MA.8.DP.1.3	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice:</p> 			<p>Incorrect choice.</p>

Problem 2a		Standards: MA.8.DP.1.2, MTR.2.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p><i>Responses vary.</i></p> 	<p>Response shows conceptual understanding with minor errors.</p> <p>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.</p> <p>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.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Students who plot a positive association without outliers may need additional support with this unit's vocabulary.</p>	<p>Response shows limited understanding.</p>

Problem 2b		Standards: MA.8.DP.1.2, MTR.2.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: <i>Responses vary.</i></p>	<p>Response shows conceptual understanding with minor errors.</p> <p>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.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Students who plot a linear positive association may need additional support understanding the difference between linear and non-linear associations.</p>	<p>Response shows limited understanding.</p> <p>E.g., Students who plot a negative linear association.</p>

Problem 3		Standard: MA.8.DP.1.2	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>All correct choices and no incorrect choices.</p> <ul style="list-style-type: none"> <i>x</i>: Money in a bank account <i>y</i>: Money spent from the bank account <i>x</i>: Time working <i>y</i>: Free time <i>x</i>: Speed that you walk <i>y</i>: Time to get to your destination 	<p>One or two correct choices and no incorrect choices.</p> <p>All correct choices and one incorrect choice.</p>	<p>One or two correct choices and one incorrect choice.</p>	<p>Only incorrect choices.</p> <p>Two or more incorrect choices with some correct choices.</p>

Problem 4a		Standard: MA.8.DP.1.3	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: Responses vary.</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., The slope of the line generally follows the trend of the data but is shifted vertically.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., The line goes through the center of the data but does not fit the trend of the data.</p>	<p>Response shows limited understanding.</p>

Problem 4b		Standard: MA.8.DP.1.3	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: 160 cups</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g, Students may have correctly substituted 40 for x in the equation but then made a minor calculation error.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g, Students who write 100 cups may have substituted 40 for y in the equation and then solved for x.</p>	<p>Response shows limited understanding.</p>

Problem 4c		Standards: MA.8.DP.1.3, MA.8.AR.3.5	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p>-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.</p>	<p>Correct response with minor flaws in explanation.</p> <p>E.g., Response includes "2 fewer cups of hot chocolate are sold" but does not specify the 1-degree increase in temperature.</p> <p>Incorrect response with logical and complete explanation.</p> <p>E.g., a student writes 2 for the slope.</p>	<p>Correct response with incomplete explanation.</p> <p>Incorrect response with explanation that shows partial understanding.</p> <p>E.g., Response includes "For every 2-degree increase in temperature, 1 fewer cups of hot chocolate is sold."</p>	<p>Incorrect response with no explanation.</p>

Unit 6

**Show What You
Know PDFs**

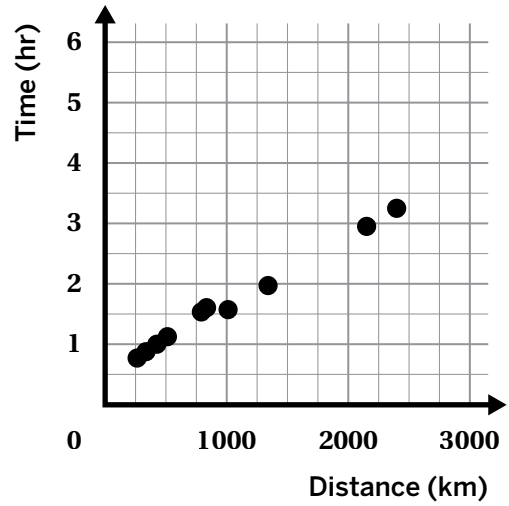
Show What You Know



6.01

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?



Show What You Know

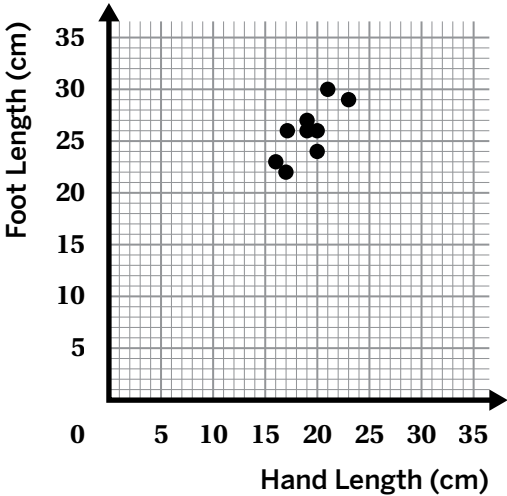


6.02

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



Show What You Know

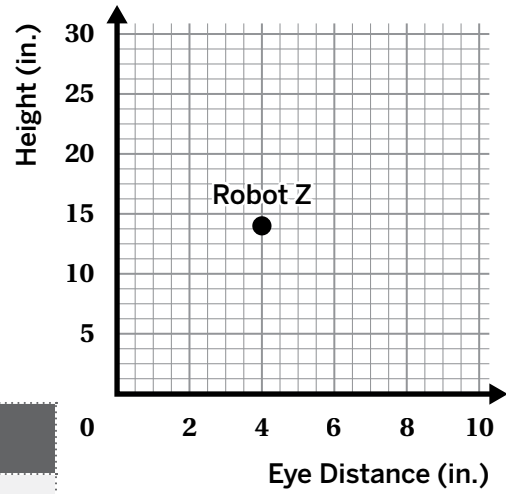


6.03

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		



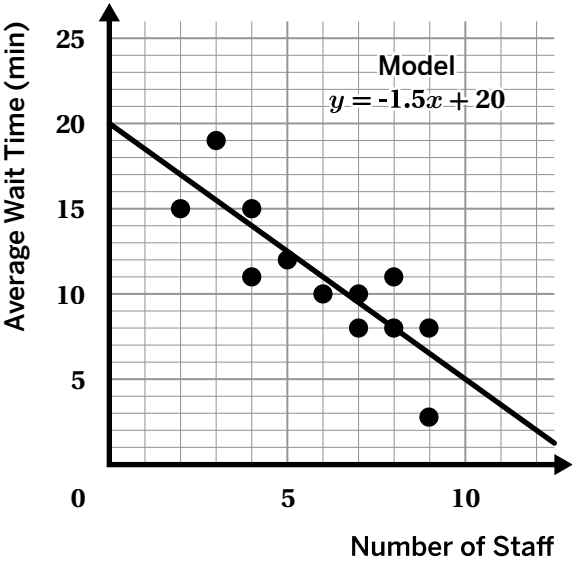
Show What You Know



6.04

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?



Show What You Know

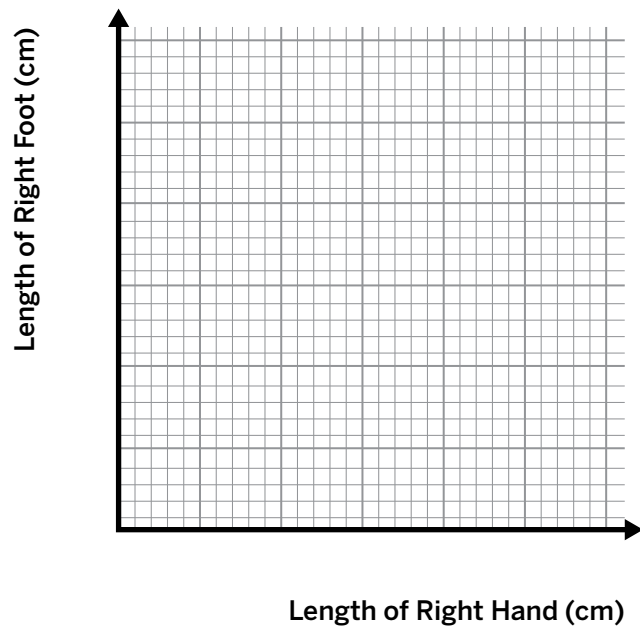


6.05

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.
- b Create a scatter plot of the data.

	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

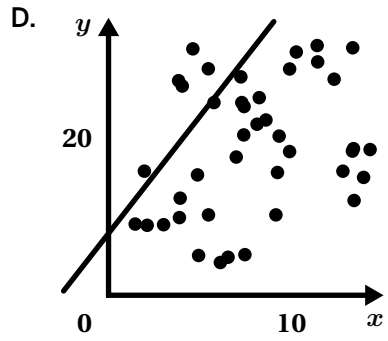
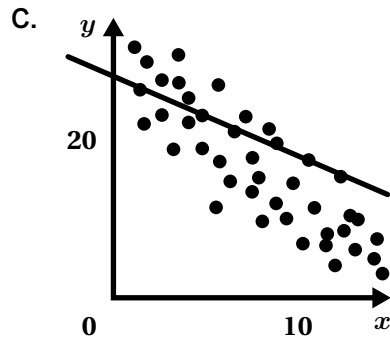
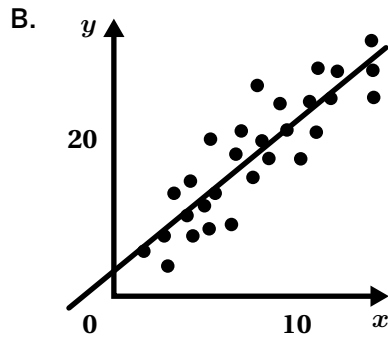
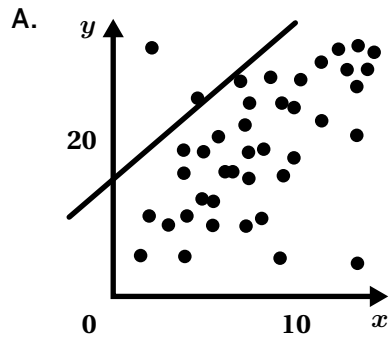


Show What You Know



6.06

Which scatter plot has the best line of fit?



Explain your thinking.

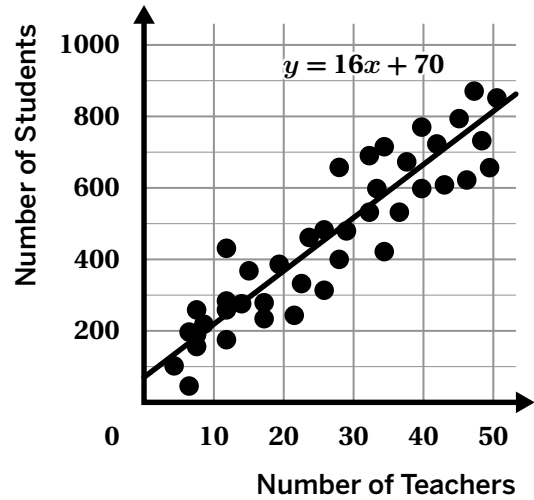
Show What You Know



6.07

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 . . .

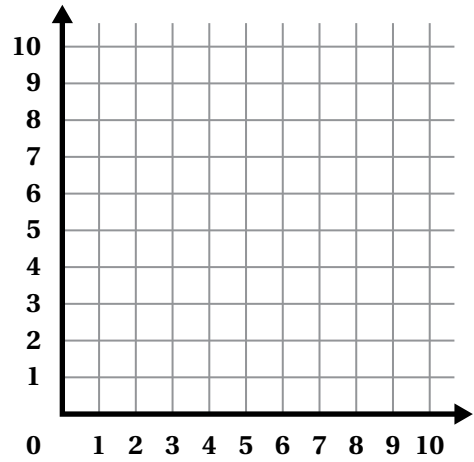
This means . . .

Show What You Know



6.08

Create a scatter plot that has a strong positive linear association, with clusters.

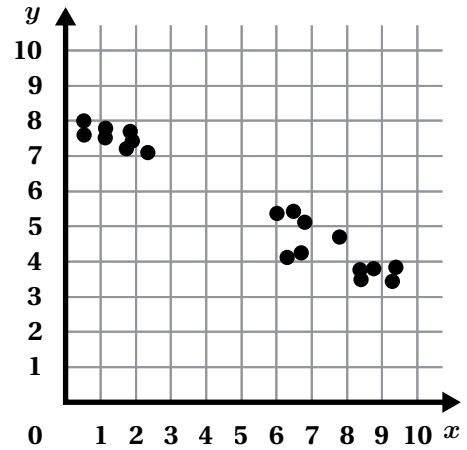


Show What You Know



6.09

- 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.



Show What You Know Lesson 1

Name: _____ Date: _____ Period: _____

Show What You Know 6.01

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.

Grade 8 251 © Angify Education, Inc. and its licensors. Angify District Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 2

Name: _____ Date: _____ Period: _____

Show What You Know 6.02

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

Grade 8 252 © Angify Education, Inc. and its licensors. Angify District Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 3

Name: _____ Date: _____ Period: _____

Show What You Know 6.03

The table shows the height and eye distance for Robot W.

- Plot a point to represent Robot W.
Response shown on graph.
- 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

Grade 8 253 © Angify Education, Inc. and its licensors. Angify District Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 4

Name: _____ Date: _____ Period: _____

Show What You Know 6.04

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

Grade 8 254 © Angify Education, Inc. and its licensors. Angify District Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 5

Name: _____ Date: _____ Period: _____

Show What You Know 6.05

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

Grade 8 255 © Amplify Education, Inc. and its licensors. Amplify Essential Math is based on work from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 6

Name: _____ Date: _____ Period: _____

Show What You Know 6.06

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.

Grade 8 256 © Amplify Education, Inc. and its licensors. Amplify Essential Math is based on work from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 7

Name: _____ Date: _____ Period: _____

Show What You Know 6.07

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.*

Grade 8 257 © Amplify Education, Inc. and its licensors. Amplify Essential Math is based on work from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 8

Name: _____ Date: _____ Period: _____

Show What You Know 6.08

Create a scatter plot that has a strong positive linear association, with clusters.
Responses vary. Sample shown on graph.

Grade 8 258 © Amplify Education, Inc. and its licensors. Amplify Essential Math is based on work from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 9

Name: _____ Date: _____ Period: _____

Show What You Know
 6.09

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.

x	y
1	8.5
2	8.0
3	7.5
4	7.0
5	6.5
6	6.0
7	5.5
8	5.0
9	4.5
10	4.0

Grade 8
259
© Amplify Education, Inc. and its licensors. Amplify Distance Math is based on materials from Illustrative Mathematics (IM) and Open Up Resources.

Unit 7

Assessments and Rubrics

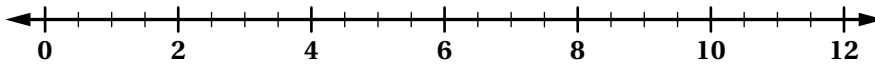
Pre-Unit Check

Unit 7

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 , $(\frac{1}{2})^2$, 5^1 .



3. $(\frac{1}{4})^3$ and $\frac{1}{4} \cdot \frac{1}{16}$ are equivalent expressions. Complete the table so that there are *five* equivalent expressions.

Expression 1	$(\frac{1}{4})^3$
Expression 2	$\frac{1}{4} \cdot \frac{1}{16}$
Expression 3	
Expression 4	
Expression 5	

Pre-Unit Check (continued)**Unit 7**

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

Sub-Unit Quiz**Unit 7**

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. $5.6x(x - 0.8)$

Sub-Unit Quiz (continued)

Unit 7

5. 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 $\frac{y^{\square} \cdot y^{-2}}{y^{\square}} = y$

6. Here are three expressions that have the same value:

$$2^3 \cdot 2^3$$

$$2^6$$

$$4^3$$

- 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.8.AR.1.1	MA.8.NSO.1.3	MA.8.AR.1.3
Problem(s)	3, 5a, 5b, 5c	1, 2, 6a, 6b, 6c	4

Problem 1  Standards: MA.8.NSO.1.3, MTR.2.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice:</p> $\frac{1}{10^2} = 10^{-2}$			<p>Incorrect choice.</p> <p>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.</p>

Problem 2  Standards: MA.8.NSO.1.3, MTR.2.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>All correct choices and no incorrect choices.</p> <ul style="list-style-type: none"> • A • D • E 	<p>One or two correct choices and no incorrect choices.</p> <p>All correct choices and one incorrect choice.</p>	<p>One or two correct choices and one incorrect choice.</p>	<p>Only incorrect choices.</p> <p>Two or more incorrect choices with some correct choices.</p>

Problem 3  Standard: MA.8.AR.1.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> $\frac{-2}{x^2} \text{ or equivalent}$	<p>Response shows conceptual understanding with minor errors.</p> <p>Student misunderstands exponents in the denominator and writes.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Student uses incorrect sign.</p>	<p>Response shows limited understanding.</p>

Problem 4 Standards: MA.8.AR.1.3, MTR.2.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: A, B, and F.</p>	<p>One or two correct choices and no incorrect choices.</p> <p>All correct choices and one incorrect choice.</p>	<p>One or two correct choices and one incorrect choice.</p>	<p>Only incorrect choices. Two or more incorrect choices with some correct choices.</p>

Problem 5a Standards: MA.8.AR.1.1, MTR.5.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: Responses vary. Any pair of exponents whose sum is zero.</p>	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>

Problem 5b Standards: MA.8.AR.1.1, MTR.5.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: Responses vary. Any pair of exponents whose product is -10.</p>	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>

Problem 5c			
Standards: MA.8.AR.1.1, MTR.5.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p><i>Responses vary. Any pair of exponents where the exponent in the numerator is y greater than the exponent in the denominator.</i></p>	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>

Problem 6a			
Standard: MA.8.NSO.1.3			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p><i>Responses vary. All of the expressions equal 64 when evaluated.</i></p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response includes that each expression has the same number of twos.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response includes they are all the same when multiplied.</p>	<p>Response shows limited understanding.</p>

Problem 6b			
Standard: MA.8.NSO.1.3			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p><i>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.</i></p>	<p>Correct response with minor flaws in explanation.</p> <p>Incorrect response with logical and complete explanation.</p> <p>E.g., Response includes "2 · 2 · 2 · 2 · 2 · 2 because there are six 2s."</p>	<p>Correct response with incomplete explanation.</p> <p>Incorrect response with explanation that shows partial understanding.</p> <p>E.g., Response includes "$4^2 + 4^1$ because there are three 4s."</p>	<p>Incorrect response with no explanation.</p>

Problem 6c		Standards: MA.8.NSO.1.3, MTR.4.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p><i>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.</i></p>	<p>Correct response with minor flaws in explanation.</p> <p>Incorrect response with logical and complete explanation.</p> <p>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.”</p>	<p>Correct response with incomplete explanation.</p> <p>Incorrect response with explanation that shows partial understanding.</p> <p>E.g., Response states “Move 2^{-10} to the top and then simplify.”</p>	<p>Incorrect response with no explanation.</p>

End-of-Unit Assessment**Unit 7**

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.

End-of-Unit Assessment (continued)

Unit 7

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 $\frac{x^3}{x^{\square}} = x^{\square}$

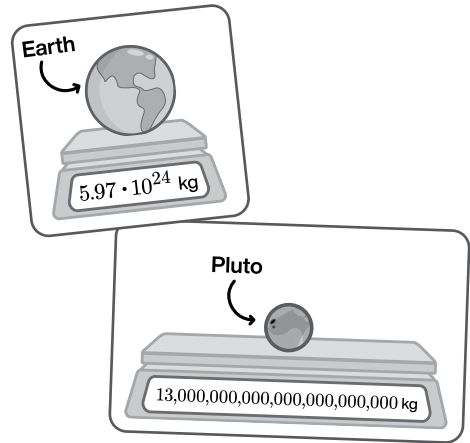
c $(x^3)^{\square} = x^6$

End-of-Unit Assessment (continued)

Unit 7

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.

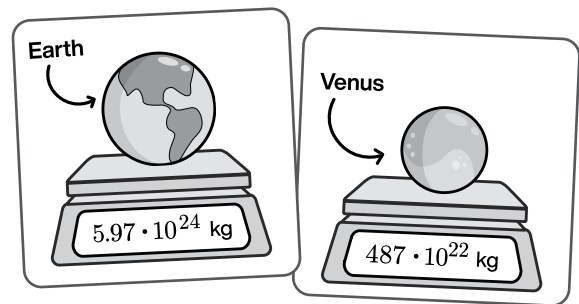
Is her claim correct?


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.



 Standard	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)	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
<p>Correct choice:</p> <p>$4^2 \cdot 4^{10}$</p>			<p>Incorrect choice.</p> <p>Students who select $4^6 + 4^6$ may remember that exponents are added but not understand when and why that rule works.</p> <p>Students who select $4^3 \cdot 4^4$ may be multiplying the exponents.</p>


Problem 2		 Standards: MA.8.AR.1.1, MA.8.NSO.1.4	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>All correct choices and no incorrect choices.</p> <ul style="list-style-type: none"> • $4,000,000$ • $40 \cdot 10^5$ • $\frac{1.2 \cdot 10^9}{3 \cdot 10^2}$ 	<p>One or two correct choices and no incorrect choices.</p> <p>All correct choices and one incorrect choice.</p>	<p>One or two correct choices and one incorrect choice.</p>	<p>Only incorrect choices.</p> <p>Two or more incorrect choices with some correct choices.</p>


Problem 3 Standard: MA.8.NSO.1.4			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice:</p> <p>30</p>			<p>Incorrect choice.</p> <p>Students who select 2.6 or 26 may have subtracted the coefficients without first considering the operation to use.</p> <p>Students who select 3 may have correctly divided the coefficients without first considering the exponents.</p>


Problem 4 Standards: MA.8.NSO.1.5, MA.8.NSO.1.6, MTR.2.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>Responses between $8 \cdot 10^8$ and $8.4 \cdot 10^8$ are considered correct.</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>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.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write $2.1 \cdot 10^6$ may have divided instead of multiplied.</p>	<p>Response shows limited understanding.</p>


Problem 5a Standards: MA.8.NSO.1.4, MTR.5.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <ul style="list-style-type: none"> • $8.2 \cdot 10^6$ • $4.1 \cdot 10^{-4}$ 	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., One expression is correct and the other expression is off by one power.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Students write $82 \cdot 10^5$ and $41 \cdot 10^{-3}$.</p>	<p>Response shows limited understanding.</p> <p>E.g., Both expressions are off by one power.</p>


Problem 5b  Standards: MA.8.NSO.1.4, MTR.5.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>$2 \cdot 10^{10}$</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Expression is off by one power.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Student uses a negative exponent.</p>	<p>Response shows limited understanding.</p>


Problem 6a  Standards: MA.8.AR.1.1, MTR.5.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p><i>Responses vary. Any pair of a positive and a negative exponent whose sum is zero.</i></p>	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>

Problem 6b  Standards: MA.8.AR.1.1, MTR.5.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p><i>Responses vary. Any pair of a positive and a negative exponent whose sum is 3.</i></p>	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>

Problem 6c  Standards: MA.8.AR.1.1, MTR.5.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>2</p>	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>

Problem 7a  Standards: MA.8.NSO.1.5, MA.8.NSO.1.6, MTR.6.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>5.983 • 10²⁴ kilograms (or equivalent)</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response incorrectly converts the mass of Pluto to scientific notation before adding.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>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.</p>	<p>Response shows limited understanding.</p>

Problem 7b  Standards: MA.8.NSO.1.4, MA.8.NSO.1.6, MTR.6.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p>Yes. Explanations vary. 100 Plutos would have a mass of $1.3 \cdot 10^{24}$ kg, which is less than the mass of Earth.</p>	<p>Correct response with minor flaws in explanation.</p> <p>Incorrect response with logical and complete explanation.</p> <p>Students who correctly explain that the mass of 100 Plutos is about $1.3 \cdot 10^{24}$ kg may have misunderstood the question.</p>	<p>Correct response with incomplete explanation.</p> <p>Students who do not compare the mass of Earth and 100 Plutos may have reasoned about a solution without verifying numerically.</p> <p>Incorrect response with explanation that shows partial understanding.</p>	<p>Incorrect response with no explanation.</p>

Problem 7c  Standards: MA.8.NSO.1.5, MA.8.NSO.1.6, MTR.6.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p>$1.1 \cdot 10^{24}$ 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.</p>	<p>Correct response with minor flaws in explanation.</p> <p>Incorrect response with logical and complete explanation.</p> <p>E.g., Response includes an error subtracting 5.9 and 4.87 but correctly writes the result as the coefficient times 10^{24}.</p>	<p>Correct response with incomplete explanation.</p> <p>Incorrect response with explanation that shows partial understanding.</p> <p>Students who write $481.03 \cdot 10^2$ may have subtracted the coefficients and the exponents separately.</p>	<p>Incorrect response with no explanation.</p>

*In Form B, 8.EE.A.4 is addressed in 7b and 8.EE.A.3 is addressed in 7c.

End-of-Unit Assessment**Unit 7**

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?

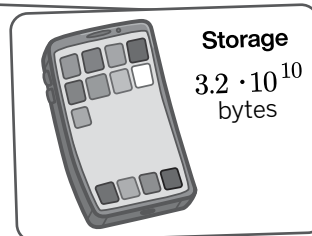
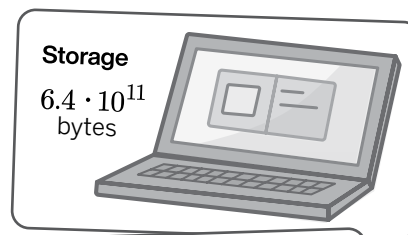
The laptop has ___ times as much storage as the phone.

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.

End-of-Unit Assessment (continued)**Unit 7**

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 $\frac{y^{\square}}{y^2} = y^{\square}$

End-of-Unit Assessment (continued)

Unit 7

7. Here are the number of seats in the two largest stadiums in Texas.

a Calculate the total seating of the two stadiums.

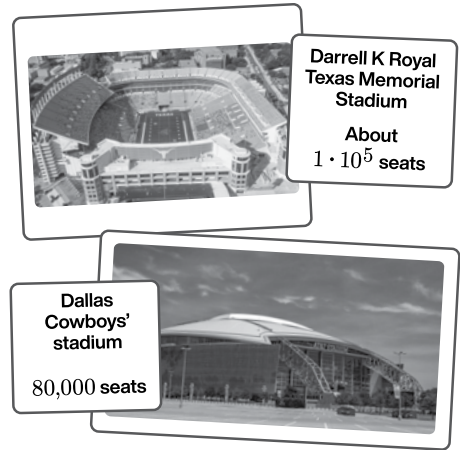
b Calculate the difference between the seating at these two stadiums.

Show or explain your thinking.

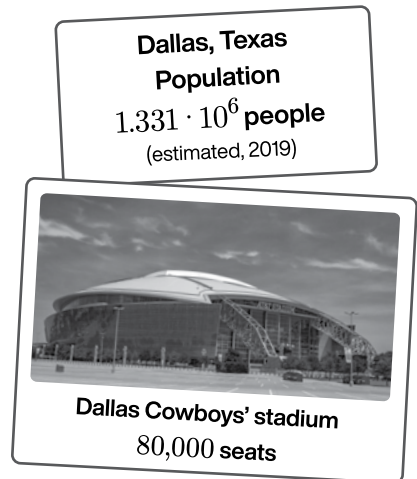
c Gabriel says that 10 Dallas Cowboys' stadiums could seat the entire population of Dallas.


Is his claim correct?


Show or explain your thinking.




Source: Shutterstock



 Standard	MA.8.AR.1.1	MA.8.NSO.1.4	MA.8.NSO.1.5	MA.8.NSO.1.6
Problem(s)	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	
<p>Correct choice:</p> <p>$6^2 \cdot 6^8$</p>			<p>Incorrect choice.</p> <p>Students who select $6^5 + 6^5$ may remember that exponents are added but not understand when and why that rule works.</p> <p>Students who select $6^2 \cdot 6^5$ may be multiplying the exponents.</p>	


Problem 2				 Standards: MA.8.AR.1.1, MA.8.NSO.1.4
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Both correct choices and no incorrect choices.</p> <ul style="list-style-type: none"> • 600,000 • $\frac{12 \cdot 10^8}{2 \cdot 10^3}$ 	<p>One correct choice and no incorrect choices.</p> <p>Both correct choices and one incorrect choice.</p>	<p>One correct choice and one incorrect choice.</p>	<p>Only incorrect choices.</p> <p>Two or more incorrect choices with some correct choices.</p>	


Problem 3 Standard: MA.8.NSO.1.4			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice:</p> <p>20</p>			<p>Incorrect choice.</p> <p>Students who select 3.2 or 32 may have subtracted the coefficients without first considering the operation to use.</p> <p>Students who select 2 may have correctly divided the coefficients without first considering the exponents.</p>


Problem 4 Standards: MA.8.NSO.1.5, MA.8.NSO.1.6, MTR.2.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>Responses between $1.2 \cdot 10^5$ and $1.24 \cdot 10^5$ hours are considered correct.</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>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.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write $3.1 \cdot 10^2$ may have divided instead of multiplied.</p> <p>Students who write $124 \cdot 10^3$ may need support writing numbers in scientific notation.</p>	<p>Response shows limited understanding.</p>

Problem 5a Standards: MA.8.NSO.1.4, MTR.5.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <ul style="list-style-type: none"> • $6.6 \cdot 10^6$ • $2.2 \cdot 10^{-3}$ 	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., One expression is correct and the other expression is off by one power.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Students write $66 \cdot 10^5$ and $22 \cdot 10^{-2}$.</p>	<p>Response shows limited understanding.</p>

Problem 5b  Standards: MA.8.NSO.1.4, MTR.5.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>$3 \cdot 10^9$</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Expression is off by one power.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Student uses a negative exponent.</p>	<p>Response shows limited understanding.</p>

Problem 6a  Standards: MA.8.AR.1.1, MTR.5.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p><i>Responses vary.</i> Any pair of a positive and a negative exponent whose sum is zero.</p>	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>

Problem 6b  Standards: MA.8.AR.1.1, MTR.5.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>6</p>	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>

Problem 6c  Standards: MA.8.AR.1.1, MTR.5.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p><i>Responses vary.</i> Any pair of a positive and a negative exponent whose difference is 2.</p>	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>

Problem 7a			
Standards: MA.8.NSO.1.5, MA.8.NSO.1.6, MTR.6.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>$1.8 \cdot 10^5$ seats (or equivalent)</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response incorrectly converts the seating in the Cowboys' stadium to scientific notation before adding.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>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.</p>	<p>Response shows limited understanding.</p>

Problem 7b			
Standards: MA.8.NSO.1.4, MA.8.NSO.1.6, MTR.6.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p>$2 \cdot 10^4$ seats (or equivalent). <i>Explanations vary.</i> 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 $10 - 8$.</p>	<p>Correct response with minor flaws in explanation.</p> <p>Incorrect response with logical and complete explanation.</p> <p>E.g., Response includes an error subtracting but a correct result of the student's coefficient times 10^4.</p>	<p>Correct response with incomplete explanation.</p> <p>Incorrect response with explanation that shows partial understanding.</p> <p>Students who write $7 \cdot 10^1$ may have subtracted the coefficients and the exponents separately.</p>	<p>Incorrect response with no explanation.</p>

Problem 7c			
Standards: MA.8.NSO.1.5, MA.8.NSO.1.6, MTR.6.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p>No. Explanations vary. 10 of the Cowboys' stadiums would seat $8 \cdot 10^5$ people, which is less than the population of Dallas.</p>	<p>Correct response with minor flaws in explanation.</p> <p>Incorrect response with logical and complete explanation.</p> <p>Students who correctly explain that 10 of the Cowboys stadiums seat about $8 \cdot 10^5$ people may have misunderstood the question.</p>	<p>Correct response with incomplete explanation.</p> <p>Students who do not compare the seating in the stadium and the population of Dallas may have reasoned about a solution without verifying numerically.</p> <p>Incorrect response with explanation that shows partial understanding.</p>	<p>Incorrect response with no explanation.</p>

*In Form A, 8.EE.A.3 is addressed in 7b and 8.EE.A.4 is addressed in 7c.

Unit 7

**Show What You
Know PDFs**

Show What You Know



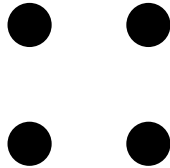
7.01

Here is a new pattern.

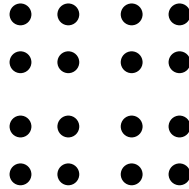
Stage 0



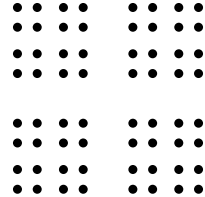
Stage 1



Stage 2



Stage 3



How many circles will there be in Stage 5? Write your answer as a number or expression.

Show What You Know**7.02**

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

Show What You Know**7.03**

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.

Show What You Know



7.04

Simplify the expression $\frac{24x^5y}{6x^2y^3}$.

Show What You Know**7.05**

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. $-2x^2(x + 3)$

Show What You Know

**7.06**

Determine the GCF of each pair of expressions below.

a $9y^3$ and $15y$

b $\frac{1}{5}a^3b^2$ and $\frac{3}{5}a^2b$

Show What You Know



7.07

Write 3,500,000 as a combination of powers of 10.

Show What You Know



7.08

Write 0.00052 as a number times a single power of 10.

Show What You Know**7.09**

Write each number in scientific notation.

Number	Scientific Notation
48,200	
0.00099	
$36 \cdot 10^5$	

Show What You Know**7.10**

Multiply or divide each expression. Write your answer in scientific notation.

a $(3 \cdot 10^{-5}) \cdot (9 \cdot 10^{11})$

b $\frac{6 \cdot 10^8}{2 \cdot 10^3}$

Show What You Know



7.11

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.

Show What You Know



7.12

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.

Show What You Know




7.13





Determine the value of $2.3 \cdot 10^5 + 3.6 \cdot 10^6$. Write your answer in scientific notation.

Show What You Know Lesson 1

Name: _____ Date: _____ Period: _____

Show What You Know  7.01

Here is a new pattern.


Stage 0	Stage 1	Stage 2	Stage 3
			

How many circles will there be in Stage 5? Write your answer as a number or expression.
 4^2 (or equivalent)

Grade 8 291 © Amplify Education, Inc. and its licensors. Amplify Distance Math is based on content from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 2

Name: _____ Date: _____ Period: _____

Show What You Know  7.02


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

Grade 8 292 © Amplify Education, Inc. and its licensors. Amplify Distance Math is based on content from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 3

Name: _____ Date: _____ Period: _____

Show What You Know  7.03

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.

Grade 8 293 © Amplify Education, Inc. and its licensors. Amplify Distance Math is based on content from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 4

Name: _____ Date: _____ Period: _____

Show What You Know  7.04


Simplify the expression $\frac{24x^5y}{6x^2y^2}$.

$\frac{4x^3}{y^2}$

Grade 8 294 © Amplify Education, Inc. and its licensors. Amplify Distance Math is based on content from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know **Lesson 5**

Name: _____ Date: _____ Period: _____

Show What You Know  **7.05**


Select all expressions equivalent to $-\frac{1}{4}x^2(8x + 24)$.

- A. $-2x^2 + 6x^2$
- B. $-2x^2 - 6x^2$
- C. $-2x^2 - 6x^2$
- D. $-2x^2(x + 3)$

Grade 8 **295** © Amplify Education, Inc. and its licensors. Amplify Essential Math is based on materials from Illustrative Mathematics (IM) and Open Up Resources.

Show What You Know **Lesson 6**

Name: _____ Date: _____ Period: _____

Show What You Know  **7.06**


Determine the GCF of each pair of expressions below.

- a. $9y^2$ and $15y$ **$3y$**
- b. $\frac{1}{3}a^2b^2$ and $\frac{3}{5}a^2b$ **$\frac{1}{5}a^2b$**

Grade 8 **296** © Amplify Education, Inc. and its licensors. Amplify Essential Math is based on materials from Illustrative Mathematics (IM) and Open Up Resources.

Show What You Know **Lesson 7**

Name: _____ Date: _____ Period: _____

Show What You Know  **7.07**

Write 3,500,000 as a combination of powers of 10.


Responses vary.

- $3 \cdot 10^6 + 5 \cdot 10^5$
- $3.5 \cdot 10^6$
- $35 \cdot 10^5$
- $2 \cdot 10^6 + 15 \cdot 10^5$

Grade 8 **297** © Amplify Education, Inc. and its licensors. Amplify Essential Math is based on materials from Illustrative Mathematics (IM) and Open Up Resources.

Show What You Know **Lesson 8**

Name: _____ Date: _____ Period: _____

Show What You Know  **7.08**

Write 0.00052 as a number times a single power of 10.


Responses vary.

- $52 \cdot 10^{-6}$
- $5.2 \cdot 10^{-4}$
- $0.52 \cdot 10^{-2}$

Grade 8 **298** © Amplify Education, Inc. and its licensors. Amplify Essential Math is based on materials from Illustrative Mathematics (IM) and Open Up Resources.

Show What You Know Lesson 9

Name: _____ Date: _____ Period: _____

Show What You Know  **7.09**


Write each number in scientific notation.

Number	Scientific Notation
48,200	$4.82 \cdot 10^4$
0.00099	$9.9 \cdot 10^{-4}$
$36 \cdot 10^3$	$3.6 \cdot 10^6$

Grade 8 **299** © Amplify Education, Inc. and its licensors. Amplify Distance Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 10

Name: _____ Date: _____ Period: _____

Show What You Know  **7.10**

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. $\frac{6 \cdot 10^8}{2 \cdot 10^3}$
 $3 \cdot 10^5$

Grade 8 **300** © Amplify Education, Inc. and its licensors. Amplify Distance Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 11

Name: _____ Date: _____ Period: _____


Show What You Know  **7.11**

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 $4 \cdot 10^4$ 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. $1.7 \cdot 10^4$ is about the same as $16 \cdot 10^3$. To make $4 \cdot 10^3$ into $16 \cdot 10^3$, I can multiply by 4 and 10^2 .



Alaska is about:
 $1.7 \cdot 10^6$
square kilometers




Rhode Island is about:
 $4 \cdot 10^3$
square kilometers

Grade 8 **301** © Amplify Education, Inc. and its licensors. Amplify Distance Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 12

Name: _____ Date: _____ Period: _____

Show What You Know  **7.12**

There are about:

- $8 \cdot 10^9$ grains of sand in one cubic meter.
- $7 \cdot 10^{31}$ cubic meters of sand on Earth.
- 10^{21} stars in a galaxy.
- 10^{22} 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 $10^{21} \cdot 10^{22}$ stars in the universe, which is 10^{43} . There are only $5.6 \cdot 10^{31}$ grains of sand on Earth because $(8 \cdot 10^9) \cdot (7 \cdot 10^{31})$ is $5.6 \cdot 10^{41}$. Therefore, the number of stars in the universe is greater than the number of grains of sand on Earth.

Grade 8 **302** © Amplify Education, Inc. and its licensors. Amplify Distance Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know **Lesson 13**

Name: _____ Date: _____ Period: _____

Show What You Know

7.13

Determine the value of $2.3 \cdot 10^5 + 3.6 \cdot 10^5$. Write your answer in scientific notation. $3.83 \cdot 10^5$. *Work varies.*

$$\begin{aligned} 2.3 \cdot 10^5 + 3.6 \cdot 10^5 &= 2.3 \cdot 10^5 + 3.6 \cdot 10^5 \\ &= 38.3 \cdot 10^4 \\ &= 3.83 \cdot 10^5 \end{aligned}$$

Unit 8

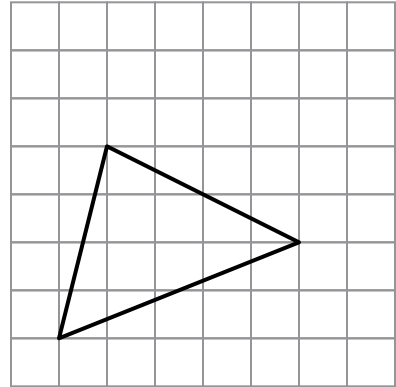
Assessments and Rubrics

Pre-Unit Check

Unit 8

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 $b^3 = 8$

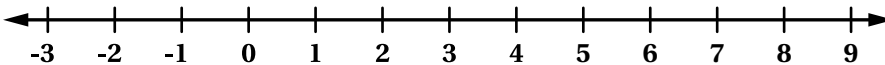
c $10^c = 1000$

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 .

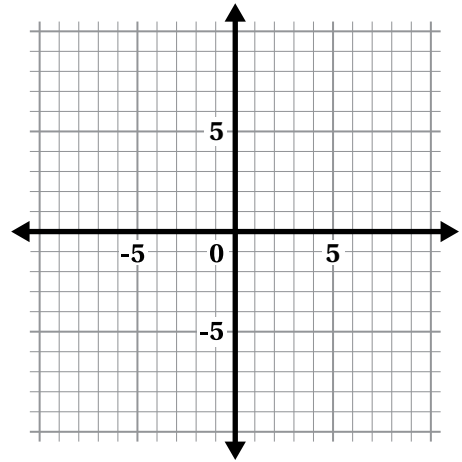


Pre-Unit Check (continued)

Unit 8

5. How long is the segment from $(-5, 2)$ to $(-5, -8)$?

Use the graph if it helps you with your thinking.



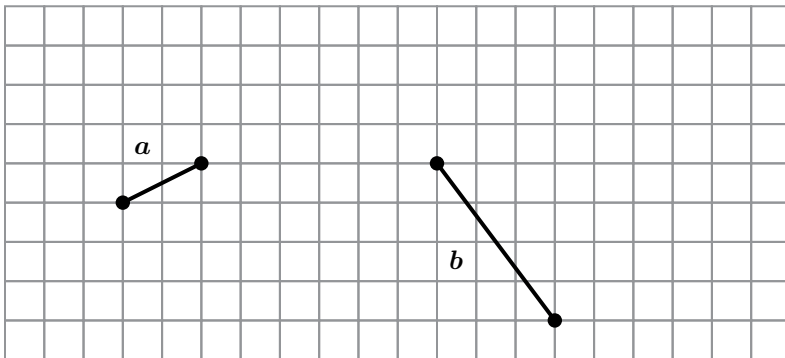
Sub-Unit Quiz

Unit 8

- Which value is an exact solution to the equation $z^2 = 20$?
 - $z = 10$
 - $z = \sqrt{20}$
 - $z = 4.5$
 - $z = \sqrt{10}$
- Which value is the exact edge length of a cube whose volume is 36 cubic inches?
 - $\sqrt[3]{36}$ inches
 - 6 inches
 - $\sqrt{36}$ inches
 - 12 inches

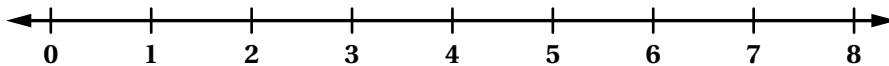
3. Determine the exact length of each line segment, in units. Show or explain your thinking.

Line segment	Exact Length (units)
<i>a</i>	
<i>b</i>	



Sub-Unit Quiz (continued)**Unit 8**

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
<p>Correct choice:</p> $z = \sqrt{20}$			<p>Incorrect choice.</p> <p>Students who select $z = 10$ may have solved $2z = 20$ instead.</p>

Problem 2		 Standards: MA.8.AR.2.3, MTR.3.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice:</p> $\sqrt[3]{36}$ inches			<p>Incorrect choice.</p> <p>Students who select 12 inches may have solved $3s = 36$ instead.</p>

Problem 3		 Standards: MA.8.AR.2.3, MTR.5.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> $a = \sqrt{5}$ 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.	<p>Response shows conceptual understanding with minor errors.</p> <p>One or two segments calculated with minor flaws in explanation.</p> <p>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."</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>One or two segments calculated with incomplete explanation.</p> <p>Incorrect response with explanation that shows partial understanding.</p> <p>E.g., "I drew tilted squares and triangles."</p>	<p>Response shows limited understanding.</p> <p>Incorrect response with no explanation.</p>

Problem 4			
Standards: MA.8.NSO.1.1, MA.8.NSO.1.2, MTR.5.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response includes both:</p> <ul style="list-style-type: none"> $\sqrt{37}$ near the middle of 6 and 7. $\sqrt[3]{7}$ somewhere in between 1.5 and 2. 	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response includes either:</p> <ul style="list-style-type: none"> $\sqrt{37}$ near the middle of 6 and 7. $\sqrt[3]{7}$ somewhere in between 1.5 and 2. 	<p>Response shows limited understanding.</p> <p>At least one number is plotted correctly.</p> <p>No numbers are plotted correctly.</p>

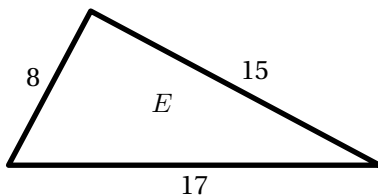
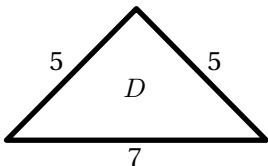
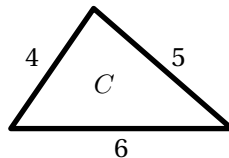
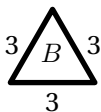
Problem 5			
Standards: MA.8.A.2.3, MTR.4.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p>a. Responses vary. $\sqrt[3]{n}$ represents the number that can be cubed to get n. This can't be found using division.</p> <p>b. 2</p>	<p>Correct response with minor flaws in explanation.</p> <p>Incorrect response with logical and complete explanation.</p> <p>E.g., Student writes that a cube root is not the same as division.</p>	<p>Correct response with incomplete explanation.</p> <p>Incorrect response with explanation that shows partial understanding.</p>	<p>Incorrect response with no explanation.</p>

End-of-Unit Assessment**Unit 8**

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 $3(4^2 - 3) - \sqrt[3]{27}$.

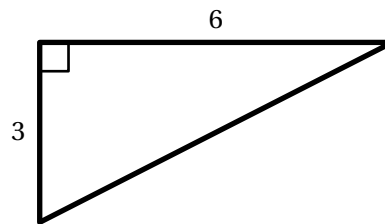
4. Select *all* rational numbers.

- A. $-\sqrt{29}$
 B. $\frac{1}{7}$
 C. 4.54
 D. π^4
 E. $-\sqrt{25}$
 F. $\sqrt[3]{9}$

End-of-Unit Assessment (continued)

Unit 8

5. What is the exact length of the unlabeled side of this right triangle, in units?



6. Here are five numbers.

$\sqrt{1}$

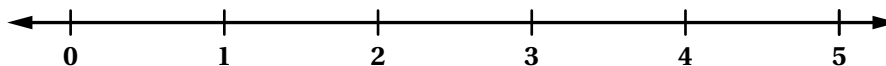
$\sqrt{10}$

$\sqrt{16}$

$\sqrt[3]{9}$

$\sqrt[3]{27}$

a Plot these values on the number line:



b Chloe plotted $\sqrt{1}$ on the number line at $\frac{1}{2}$.

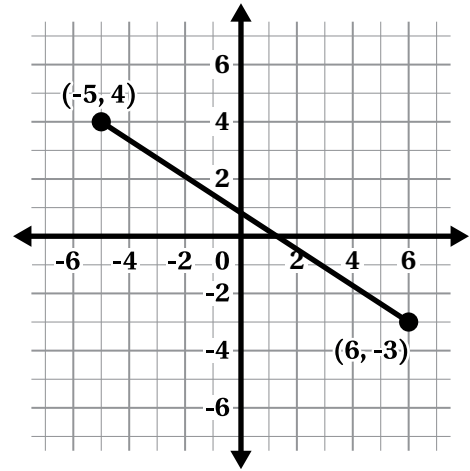
Explain how you know this cannot be the correct position for $\sqrt{1}$ on the number line.

End-of-Unit Assessment (continued)

Unit 8

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.

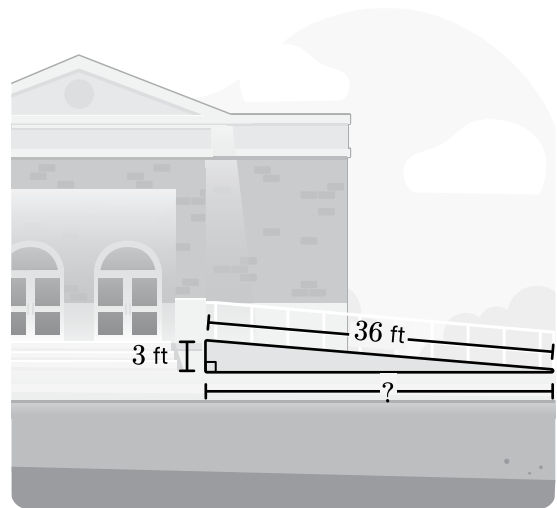


8. The city of Metropolis is building a ramp at the entrance to the town hall. There is a rise of 3 feet to get from the sidewalk to the front door. For this height, the ramp must be 36 feet long to meet accessibility regulations.

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

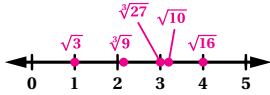
Problem 1				Standard: MA.8.AR.2.3
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Both correct choices and no incorrect choices.</p> <ul style="list-style-type: none"> • 3 • $\sqrt[3]{27}$ 	<p>One correct choice and no incorrect choices.</p> <p>Both correct choices and one incorrect choice.</p>	<p>One correct choice and one incorrect choice.</p>	<p>Only incorrect choices.</p> <p>Two or more incorrect choices with some correct choices.</p>	

Problem 2				Standards: MA.8.GR.1.3, MTR.5.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Both correct choices and no incorrect choices.</p>	<p>One correct choice and no incorrect choices.</p> <p>Both correct choices and one incorrect choice.</p>	<p>One correct choice and one incorrect choice.</p>	<p>Only incorrect choices.</p> <p>Two or more incorrect choices with some correct choices.</p>	

Problem 3				Standard: MA.8.NSO.1.7
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response:</p> <p>• 36</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Students who write 12 may have multiplied 4 by 2 instead of squaring 4.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>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.</p>	<p>Response shows limited understanding.</p>	

Problem 4 Standard: MA.8.NSO.1.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Both correct choices and no incorrect choices.</p> <p>• 4.54 • $-\sqrt{25}$</p>	<p>One correct choice and no incorrect choices.</p> <p>Both correct choice and one incorrect choice.</p>	<p>One correct choice and one incorrect choice.</p>	<p>Only incorrect choices.</p> <p>Two or more incorrect choices with some correct choices.</p>

Problem 5 Standards: MA.8.GR.1.1, MTR.3.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>$\sqrt{45}$ units (or equivalent)</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>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.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write 9 or $\sqrt{9}$ may have added the leg lengths without squaring them first.</p>	<p>Response shows limited understanding.</p>

Problem 6a Standards: MA.8.NSO.1.1, MA.8.NSO.1.2, MTR.5.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> 	<p>Response shows conceptual understanding with minor errors.</p> <p>Four out of five values are correct on the number line.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Two or three out of five values are correct on the number line.</p>	<p>Response shows limited understanding.</p> <p>One or none of the five values are correct on the number line.</p>

Problem 6b			
Standards: MA.8.NSO.1.1, MA.8.NSO.1.2, MTR.4.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p><i>Responses vary.</i> $\sqrt{1}$ cannot equal $\frac{1}{2}$ because $\left(\frac{1}{2}\right)^2$ is $\frac{1}{4}$, not 1.</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response includes a minor calculation error in calculating 4^2.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response does not compare 4^2 to $\sqrt{8}$.</p>	<p>Response shows limited understanding.</p>

Problem 7			
Standards: MA.8.GR.1.2, MTR.5.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>$\sqrt{170}$ units (or equivalent)</p>	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write $\sqrt{72}$ may have calculated $\sqrt{11^2 - 7^2}$ instead of $\sqrt{11^2 + 7^2}$.</p>	<p>Response shows limited understanding.</p> <p>Students who write 15 or 16 may have counted the number of square units that the line intersects on the grid.</p>

Problem 8			
Standards: MA.8.GR.1.1, MTR.6.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p>$\sqrt{36^2 - 3^2}$. <i>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 $b = \sqrt{36^2 - 3^2}$.</i></p>	<p>Correct response with minor flaws in explanation.</p> <p>E.g., Students write that they used the Pythagorean theorem.</p> <p>Incorrect response with logical and complete explanation.</p>	<p>Correct response with incomplete explanation.</p> <p>Incorrect response with explanation that shows partial understanding.</p>	<p>Incorrect response with no explanation.</p>

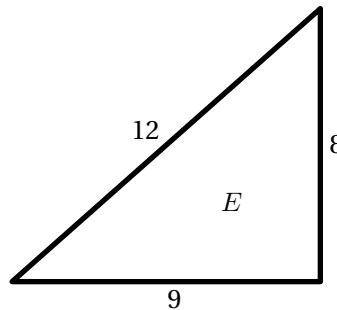
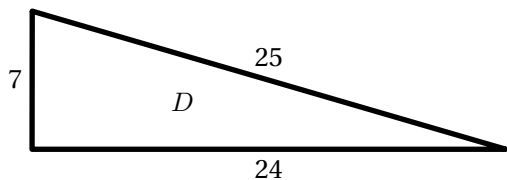
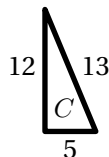
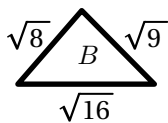
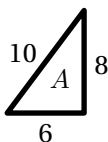
End-of-Unit Assessment

Unit 8

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 $14.2 + (2^3 - 1) \times \sqrt{4}$.

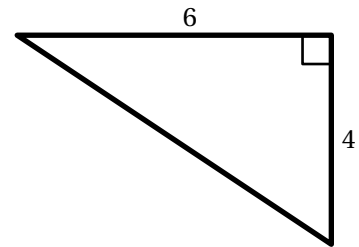
4. Select *all* irrational numbers.

- A. $-\sqrt{23}$
 B. $\frac{2}{7}$
 C. 1.3333...
 D. $\sqrt{121}$
 E. $-\pi$
 F. $\sqrt[3]{8}$

End-of-Unit Assessment (continued)

Unit 8

5. What is the exact length of the unlabeled side of this right triangle, in units?



6. Here are five numbers.

$\sqrt{2}$

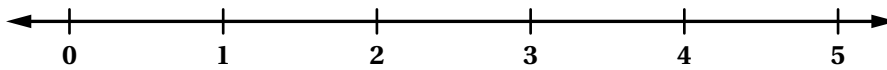
$\sqrt{8}$

$\sqrt[3]{8}$

$\sqrt[3]{28}$

$\sqrt{16}$

a Plot these values on the number line:



b Kai plotted $\sqrt{8}$ on the number line at 4.

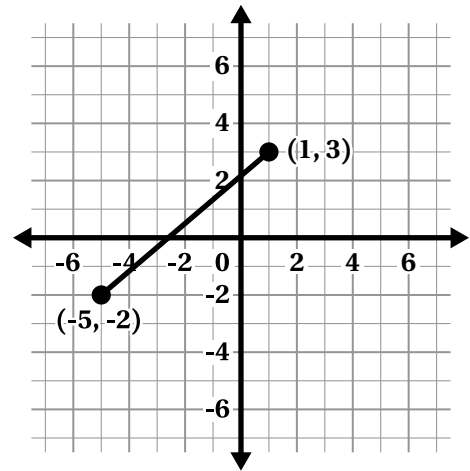
Explain how you know this cannot be the correct position for $\sqrt{8}$ on the number line.

End-of-Unit Assessment (continued)

Unit 8

7. Exactly how many units long is the line segment between the points (1, 3) and (-5, -2)?

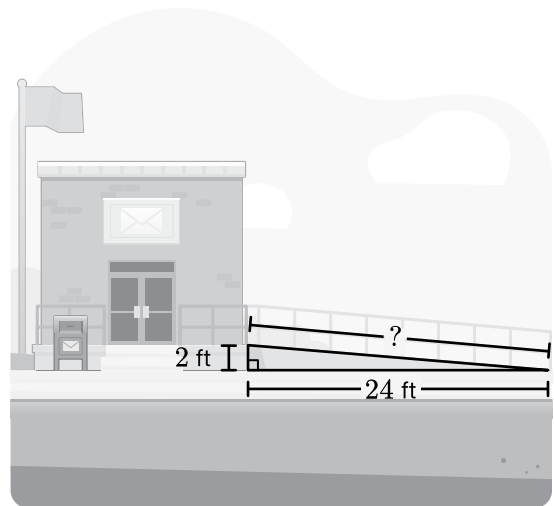
Use the graph if it helps with your thinking.



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
<p>Both correct choices and no incorrect choices.</p> <ul style="list-style-type: none"> • 2 • $\sqrt[3]{8}$ 	<p>One correct choice and no incorrect choices.</p> <p>Both correct choices and one incorrect choice.</p>	<p>One correct choice and one incorrect choice.</p>	<p>Only incorrect choices.</p> <p>Two or more incorrect choices with some correct choices.</p>

Problem 2		Standards: MA.8.GR.1.3, MTR.5.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>All correct choices and no incorrect choices.</p>	<p>One or two correct choices and no incorrect choices.</p> <p>All correct choices and one incorrect choice.</p>	<p>One or two correct choices and one incorrect choice.</p>	<p>Only incorrect choices.</p> <p>Two or more incorrect choices with some correct choices.</p>

Problem 3		Standard: MA.8.NSO.1.7	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>28.2</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Students who write 24.2 may have multiplied 2 by 3 instead of cubing 2.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>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.</p>	<p>Response shows limited understanding.</p>

Problem 4			
Standards: MA.8.NSO.1.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Both correct choices and no incorrect choices.</p> <ul style="list-style-type: none"> • $-\sqrt{23}$ • $-\pi$ 	<p>One correct choice and no incorrect choices.</p> <p>Both correct choice and one incorrect choice.</p>	<p>One correct choice and one incorrect choice.</p>	<p>Only incorrect choices.</p> <p>Two or more incorrect choices with some correct choices.</p>

Problem 5			
Standards: MA.8.GR.1.1, MTR.3.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>$\sqrt{52}$ units (or equivalent)</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>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.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write 10 or $\sqrt{10}$ may have added the leg lengths without squaring them first.</p>	<p>Response shows limited understanding.</p>

Problem 6a			
Standards: MA.8.NSO.1.1, MA.8.NSO.1.2, MTR.5.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Four out of five values are correct on the number line.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Two or three out of five values are correct on the number line.</p>	<p>Response shows limited understanding.</p> <p>One or none of the five values are correct on the number line.</p>

Problem 6b			
Standards: MA.8.NSO.1.1, MA.8.NSO.1.2, MTR.4.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p><i>Responses vary. $\sqrt{8}$ cannot equal 4 because 4^2 is 16, not 8.</i></p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response includes a minor calculation error in calculating 4^2.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response does not compare 4^2 to $\sqrt{8}$.</p>	<p>Response shows limited understanding.</p>

Problem 7			
Standards: MA.8.GR.1.2, MTR.5.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p><i>$\sqrt{61}$ units (or equivalent)</i></p>	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write 1 may have calculated $\sqrt{6^2 - 5^2}$ instead of $\sqrt{6^2 + 5^2}$.</p>	<p>Response shows limited understanding.</p> <p>Students who write 9 or 10 may have counted the number of square units that the line intersects on the grid.</p>

Problem 8			
Standards: MA.8.GR.1.1, MTR.6.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p><i>$\sqrt{24^2 + 2^2}$. 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 $c = \sqrt{2^2 + 24^2}$.</i></p>	<p>Correct response with minor flaws in explanation.</p> <p>Incorrect response with logical and complete explanation.</p> <p>E.g., Students write that they used the Pythagorean theorem.</p>	<p>Correct response with incomplete explanation.</p> <p>Incorrect response with explanation that shows partial understanding.</p>	<p>Incorrect response with no explanation.</p>

Unit 8

**Show What You
Know PDFs**

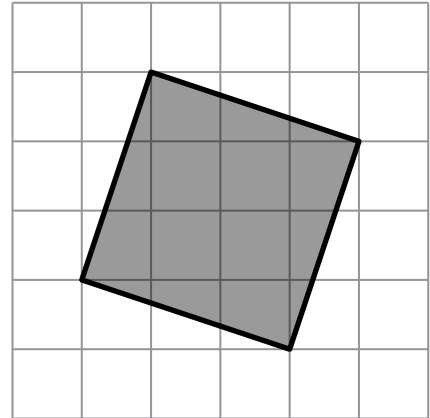
Show What You Know



8.01

Determine the area of the tilted square.

Explain your thinking.



Show What You Know**8.02**

Complete the table for each square.

Square	Side Length (units)	Area (sq. units)
<i>A</i>		100
<i>B</i>		95
<i>C</i>	6	
<i>D</i>		30

Show What You Know**8.03**

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
?	

Show What You Know**8.04**

Select *all* the numbers greater than 6 and less than 7.

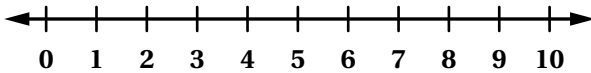
- A. $\sqrt{6.5}$
- B. $\sqrt{15}$
- C. $\sqrt{38}$
- D. $\sqrt{47}$
- E. $\sqrt{60}$

Explain your thinking.

Show What You Know**8.05**

Here is an equation: $x^3 = 24$.

- a** Write the exact solution.
- b** Plot the solution on the number line.



Show What You Know

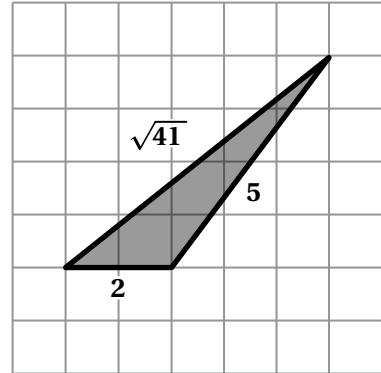


8.06

Is $a^2 + b^2 = c^2$ true for this triangle? Circle one.

Yes No I'm not sure

Show or explain your thinking.



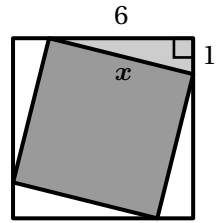
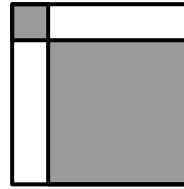
Show What You Know



8.07

Calculate the value of x .

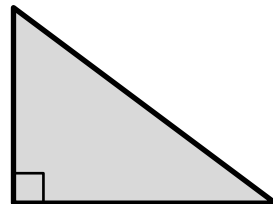
Mark the diagram if it helps with your thinking.



Show What You Know**8.08**

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?

Show What You Know

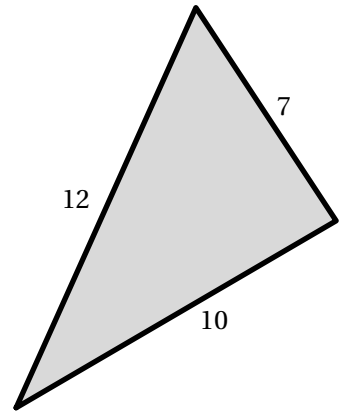


8.09

Is this a right triangle? Circle one.

Yes No

Show or explain your thinking.



Show What You Know

**8.10**

Select *all* the groups of segments that will form a triangle.

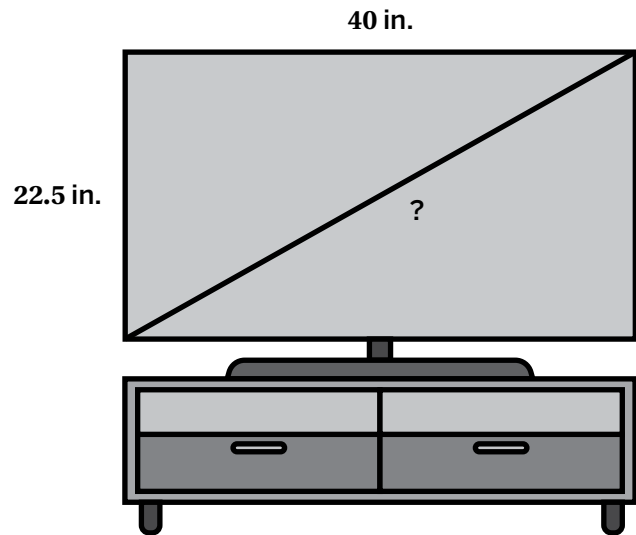
- A. 1, 2, and 5 units
- B. 6, 11, and 6 units
- C. 12, 8, and 9 units
- D. 3, 3, and 7 units
- E. 8, 15, and 6 units

Show What You Know**8.11**

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?



Show What You Know

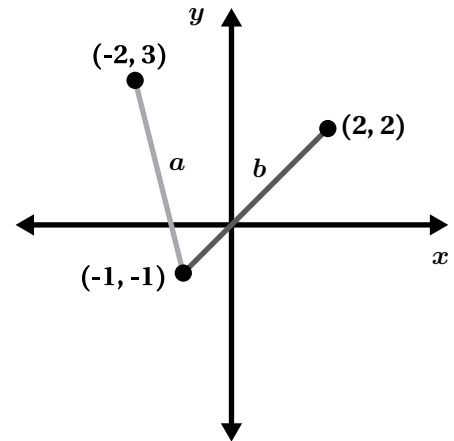


8.12

The graph shows two line segments: a and b .

What is the length of each segment?

Segment	Length (units)
a	
b	



Show What You Know

**8.13**

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.

Show What You Know**8.14**

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. $\frac{600}{25} \cdot 4 + 3.50 + 5.25 + 4.75$

Show What You Know**8.15**


Tina simplified an expression. Her work is shown.

$$\begin{aligned} & \frac{5^2}{2+3} + 3^3 \times \frac{\sqrt{10^2-19}}{3} \\ & \frac{25}{5} + 3^3 \times \frac{\sqrt{81}}{3} \\ & \frac{25}{5} + 27 \times \frac{9}{3} \\ & 5 + 27 \times 3 \\ & 32 \times 3 \\ & 96 \end{aligned}$$

What did Tina do well? What mistake did Tina make? Explain your answers with words and numbers.

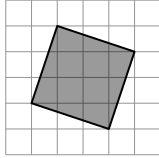
Show What You Know Lesson 1

Name: _____ Date: _____ Period: _____

Show What You Know  **8.01**

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.



Grade 8 **333** © Angify Education, Inc. and its licensors. Angify Distance Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 2

Name: _____ Date: _____ Period: _____

Show What You Know  **8.02**


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

Grade 8 **334** © Angify Education, Inc. and its licensors. Angify Distance Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 3

Name: _____ Date: _____ Period: _____

Show What You Know  **8.03**

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
?	

Grade 8 **335** © Angify Education, Inc. and its licensors. Angify Distance Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 4

Name: _____ Date: _____ Period: _____

Show What You Know  **8.04**

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.

Grade 8 **336** © Angify Education, Inc. and its licensors. Angify Distance Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 5


Name: _____ Date: _____ Period: _____

Show What You Know  8.05

Here is an equation: $x^3 = 24$.

a Write the exact solution.
 $x = \sqrt[3]{24}$


b Plot the solution on the number line.



Grade 8 337 © Amplify Education, Inc. and its licensors. Amplify Algebra Math is based on materials from Illustrative Mathematics (IM) and Open Up Resources.

Show What You Know Lesson 6

Name: _____ Date: _____ Period: _____

Show What You Know  8.06

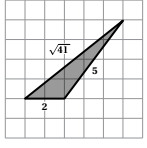
Is $a^2 + b^2 = c^2$ true for this triangle? Circle one.

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.



Grade 8 338 © Amplify Education, Inc. and its licensors. Amplify Algebra Math is based on materials from Illustrative Mathematics (IM) and Open Up Resources.

Show What You Know Lesson 7

Name: _____ Date: _____ Period: _____

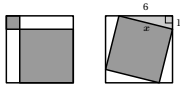
Show What You Know  8.07

Calculate the value of x .

Mark the diagram if it helps with your thinking.

$\sqrt{37}$. Work varies.


$1^2 + 6^2 = x^2$
 $1 + 36 = x^2$
 $37 = x^2$
 $\sqrt{37} = x$



Grade 8 339 © Amplify Education, Inc. and its licensors. Amplify Algebra Math is based on materials from Illustrative Mathematics (IM) and Open Up Resources.

Show What You Know Lesson 8

Name: _____ Date: _____ Period: _____

Show What You Know  8.08

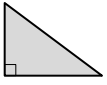
This right triangle has side lengths of 3, 4, and x units.

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.
 $3^2 + x^2 = 4^2$
 $9 + x^2 = 16$
 $x^2 = 7$
 $x = \sqrt{7}$



Grade 8 340 © Amplify Education, Inc. and its licensors. Amplify Algebra Math is based on materials from Illustrative Mathematics (IM) and Open Up Resources.

Show What You Know **Lesson 9**

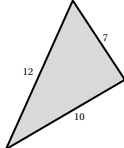
Name: _____ Date: _____ Period: _____

Show What You Know  **8.09**

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 .



Grade 8 **341** © Amplify Education, Inc. and its licensors. Amplify Distance Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know **Lesson 10**

Name: _____ Date: _____ Period: _____

Show What You Know  **8.10**


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

Grade 8 **342** © Amplify Education, Inc. and its licensors. Amplify Distance Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know **Lesson 11**

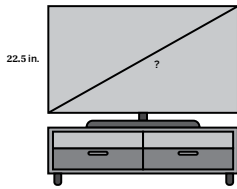
Name: _____ Date: _____ Period: _____

Show What You Know  **8.11**

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. $\sqrt{22.5^2 + 40^2} \approx 45.9$



Grade 8 **343** © Amplify Education, Inc. and its licensors. Amplify Distance Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know **Lesson 12**

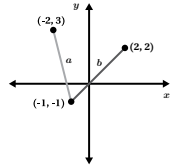
Name: _____ Date: _____ Period: _____

Show What You Know  **8.12**

The graph shows two line segments: *a* and *b*.

What is the length of each segment?


Segment	Length (units)
<i>a</i>	$\sqrt{17}$
<i>b</i>	$\sqrt{18}$



Grade 8 **344** © Amplify Education, Inc. and its licensors. Amplify Distance Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 13

Name: _____ Date: _____ Period: _____

Show What You Know  8.13

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.

Grade 8 345 © Amplify Education, Inc. and its licensors. Amplify Essential Math is based on materials from Illustrative Mathematics (IM) and Open Up Resources.

Show What You Know Lesson 14

Name: _____ Date: _____ Period: _____

Show What You Know  8.14


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. $4 \cdot \frac{25}{500} + 3.50 + 5.25 + 4.75$
 C. $600 \cdot 25 \cdot 4 + 3.50 + 5.25 + 4.75$
 D. $\frac{500}{25} \cdot 4 + 3.50 + 5.25 + 4.75$

Grade 8 346 © Amplify Education, Inc. and its licensors. Amplify Essential Math is based on materials from Illustrative Mathematics (IM) and Open Up Resources.

Show What You Know Lesson 15

Name: _____ Date: _____ Period: _____

Show What You Know  8.15

Tina simplified an expression. Her work is shown.

$$\begin{aligned} \frac{5^2}{2} + \frac{3}{3} + 3^2 \times \frac{\sqrt{10^2 - 19}}{3} \\ \frac{25}{5} + 3^2 \times \frac{\sqrt{81}}{3} \\ \frac{25}{5} + 27 \times \frac{9}{3} \\ 5 + 27 \times 3 \\ 32 \times 3 \\ 96 \end{aligned}$$

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.

Grade 8 347 © Amplify Education, Inc. and its licensors. Amplify Essential Math is based on materials from Illustrative Mathematics (IM) and Open Up Resources.

Unit 9

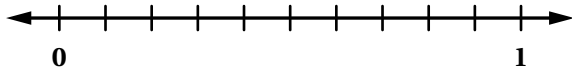
Assessments and Rubrics

Pre-Unit Check

Unit 9

1. You look at the weather forecast and it says 80% chance of $\frac{1}{4}$ inch of rain today.
 Would you wear rain 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%

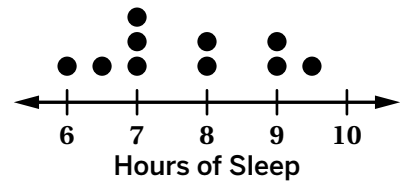
4. Jasmine surveyed 20 students at her middle school. 7 of them had at least one pet.
- a What percent of the students surveyed have at least one pet?
 - b There are 400 students at Jasmine’s middle school. If the rest of the school is consistent with these results, about how many students would have at least one pet?
 - c Explain your thinking.

Pre-Unit Check (continued)

Unit 9

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.

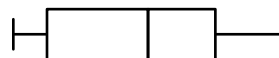


- a** How many students slept for 7 or fewer hours last night?
- b** Calculate the median number of hours that all 10 students slept?
- c** Do you think the median you calculated is similar to the median of all the students in Zoe's after school program? Explain your reasoning.

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?

End-of-Unit Assessment**Unit 9**

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.

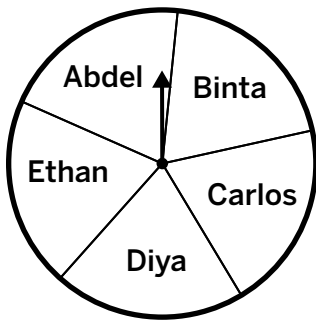
Select *all* the true statements.

- 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.

End-of-Unit Assessment (continued)

Unit 9

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)					

End-of-Unit Assessment (continued)

Unit 9


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
<p>Correct response:</p> <p>AA, AB, AC, BA, BB, BC, CA, CB, CC</p>	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write A, B, C may have only considered spinning the spinner one time.</p>	<p>Response shows limited understanding.</p>

Problem 2  Standards: MA.8.DP.2.2, MTR.3.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice:</p> <p>C. $\frac{1}{2}$</p>			<p>Incorrect choice.</p> <p>Students who select $\frac{3}{8}$ may have found the probability of tossing two tails instead of tossing <i>at least</i> two tails.</p>

Problem 3  Standards: MA.8.DP.2.3, MTR.5.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Both correct choices and no incorrect choices.</p> <p>A. McKenzie will roll a 3 about 50 times.</p> <p>B. McKenzie will roll a 4 or 5 about 100 times.</p>	<p>One correct choice and no incorrect choices.</p> <p>Both correct choices and one incorrect choice.</p>	<p>One correct choice and one incorrect choice.</p>	<p>Only incorrect choices.</p> <p>Two or more incorrect choices with some correct choices.</p>

Problem 4				Standards: MA.8.DP.2.2, MTR.3.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct choice:</p> <p>A. $\frac{1}{6}$</p>			<p>Incorrect choice.</p> <p>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.</p>	

Problem 5						Standards: MA.8.DP.2.1, MTR.7.1																																			
4 Meeting	3 Approaching	2 Developing	1 Beginning																																						
<p>Correct response:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>Abdel (A)</th> <th>Binta (B)</th> <th>Carlos (C)</th> <th>Diya (D)</th> <th>Ethan (E)</th> </tr> </thead> <tbody> <tr> <th>Abdel (A)</th> <td>AA</td> <td>AB</td> <td>AC</td> <td>AD</td> <td>AE</td> </tr> <tr> <th>Binta (B)</th> <td>BA</td> <td>BB</td> <td>BC</td> <td>BD</td> <td>BE</td> </tr> <tr> <th>Carlos (C)</th> <td>CA</td> <td>CB</td> <td>CC</td> <td>CD</td> <td>CE</td> </tr> <tr> <th>Diya (D)</th> <td>DA</td> <td>DB</td> <td>DC</td> <td>DD</td> <td>DE</td> </tr> <tr> <th>Ethan (E)</th> <td>EA</td> <td>EB</td> <td>EC</td> <td>ED</td> <td>EE</td> </tr> </tbody> </table>		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	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>		
	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
<p>Correct choice:</p> <p>C. 100</p>			<p>Incorrect choice.</p> <p>Students who select 50 may think there are 4 possible results of flipping a coin; however, there are 2 possible results.</p>

Problem 7 Standards: MA.8.DP.2.1, MTR.4.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>11, 12, 13, 14, 21, 22, 23, 24, 31, 32, 33, 34, 41, 42, 43, 44</p>	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write 1, 2, 3, 4 may have only considered drawing one card from the stack.</p>	<p>Response shows limited understanding.</p>

Problem 8 Standards: MA.8.DP.2.3, MTR.5.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>$\frac{13}{16}$ (or equivalent)</p>			<p>Incorrect choice.</p> <p>Students who write $\frac{3}{16}$ may have found the probability that the sum of the two outcomes is 4 instead of <i>at least</i> 4.</p>

End-of-Unit Assessment

Unit 9

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.

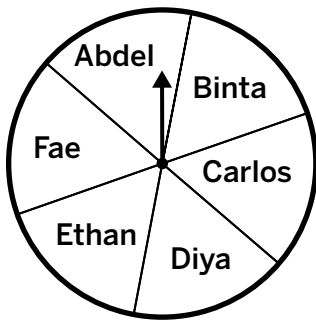
Select *all* the true statements.

- 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.

End-of-Unit Assessment (continued)

Unit 9

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)**Unit 9**


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
<p>Correct response:</p> <p>AA, AB, AC, AD, BA, BB, BC, BD, CA, CB, CC, CD, DA, DB, DC, DD</p>	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write A, B, C, D may have only considered spinning the spinner one time.</p>	<p>Response shows limited understanding.</p>

Problem 2  Standards: MA.8.DP.2.2, MTR.3.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice:</p> <p>D. $\frac{7}{8}$</p>			<p>Incorrect choice.</p> <p>Students who select $\frac{1}{2}$ may have found the probability of the student guessing one question correctly instead of guessing <i>at least</i> one question correctly.</p>

Problem 3  Standards: MA.8.DP.2.3, MTR.5.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Both correct choices and no incorrect choices.</p> <p>C. Jade will roll a 4 about 75 times.</p> <p>D. Jade will roll a 5 or 6 about 150 times.</p>	<p>One correct choice and no incorrect choices.</p> <p>Both correct choices and one incorrect choice.</p>	<p>One correct choice and one incorrect choice.</p>	<p>Only incorrect choices.</p> <p>Two or more incorrect choices with some correct choices.</p>

Problem 4			
Standards: MA.8.DP.2.2, MTR.3.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice:</p> <p>B. $\frac{1}{5}$</p>			<p>Incorrect choice.</p> <p>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.</p>

Problem 5																																																				
Standards: MA.8.DP.2.1, MTR.7.1																																																				
4 Meeting	3 Approaching	2 Developing	1 Beginning																																																	
<p>Correct response:</p> <table border="1" style="border-collapse: collapse; text-align: center;"> <thead> <tr> <th></th> <th>Abdel (A)</th> <th>Binta (B)</th> <th>Carlos (C)</th> <th>Diya (D)</th> <th>Ethan (E)</th> <th>Fae (F)</th> </tr> </thead> <tbody> <tr> <th>Abdel (A)</th> <td>AA</td> <td>AB</td> <td>AC</td> <td>AD</td> <td>AE</td> <td>AF</td> </tr> <tr> <th>Binta (B)</th> <td>BA</td> <td>BB</td> <td>BC</td> <td>BD</td> <td>BE</td> <td>BF</td> </tr> <tr> <th>Carlos (C)</th> <td>CA</td> <td>CB</td> <td>CC</td> <td>CD</td> <td>CE</td> <td>CF</td> </tr> <tr> <th>Diya (D)</th> <td>DA</td> <td>DB</td> <td>DC</td> <td>DD</td> <td>DE</td> <td>DF</td> </tr> <tr> <th>Ethan (E)</th> <td>EA</td> <td>EB</td> <td>EC</td> <td>ED</td> <td>EE</td> <td>EF</td> </tr> <tr> <th>Fae (F)</th> <td>FA</td> <td>FB</td> <td>FC</td> <td>FD</td> <td>FE</td> <td>FF</td> </tr> </tbody> </table>		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	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>
	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
<p>Correct choice:</p> <p>C. 200</p>			<p>Incorrect choice.</p> <p>Students who select 100 may think there are 4 possible results of flipping a coin; however, there are 2 possible results.</p>

Problem 7			
Standards: MA.8.DP.2.1, MTR.4.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>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</p>	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write 1, 2, 3, 4, 5 may have only considered drawing one card from the stack.</p>	<p>Response shows limited understanding.</p>

Problem 8			
Standards: MA.8.DP.2.3, MTR.5.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>$\frac{3}{5}$ (or equivalent)</p>			<p>Incorrect choice.</p> <p>Students who write $\frac{4}{25}$ may have found the probability that the sum of the two outcomes is 5 instead of <i>greater than</i> 5.</p>

Unit 9

**Show What You
Know PDFs**

Show What You Know

**9.01**

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?

Show What You Know



9.02

Draw a tree diagram or use a table to create the sample space for flipping a coin 2 times.

Show What You Know



9.03

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)?

Show What You Know**9.04**

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

Show What You Know




9.05

If you rolled a die 120 times, how many times would you expect it to land on an even number?

Show What You Know Lesson 1

Name: _____ Date: _____ Period: _____

Show What You Know  **9.01**


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

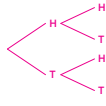
Grade 8 **373** © Amplify Education, Inc. and its licensors. Amplify Distance Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 2

Name: _____ Date: _____ Period: _____

Show What You Know  **9.02**

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

Grade 8 **374** © Amplify Education, Inc. and its licensors. Amplify Distance Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 3

Name: _____ Date: _____ Period: _____

Show What You Know  **9.03**


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%

Grade 8 **375** © Amplify Education, Inc. and its licensors. Amplify Distance Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 4

Name: _____ Date: _____ Period: _____

Show What You Know  **9.04**

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%

Grade 8 **376** © Amplify Education, Inc. and its licensors. Amplify Distance Math is based on materials from Illustrative Mathematics (IM) and OpenUp Resources.

Show What You Know Lesson 5

Name: _____ Date: _____ Period: _____

Show What You Know  **9.05**

If you rolled a die 120 times, how many times would you expect it to land on an even number?

60

Grade 8 377 © Amplify Education, Inc. and its licensors. Amplify Essential Math is based on materials from Illustrative Mathematics (IM) and Open Up Resources.

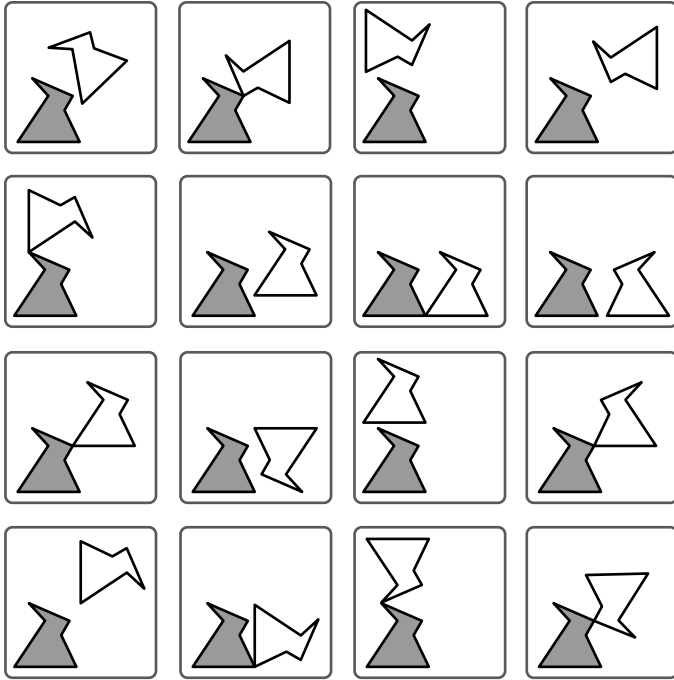
Lesson Resources

Unit 1

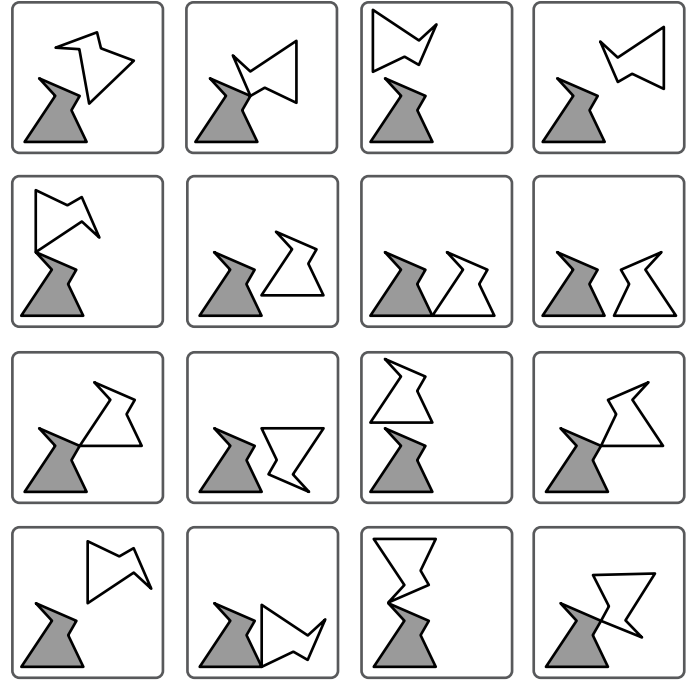
Activity Sheets and Cards

Polygraph Set A

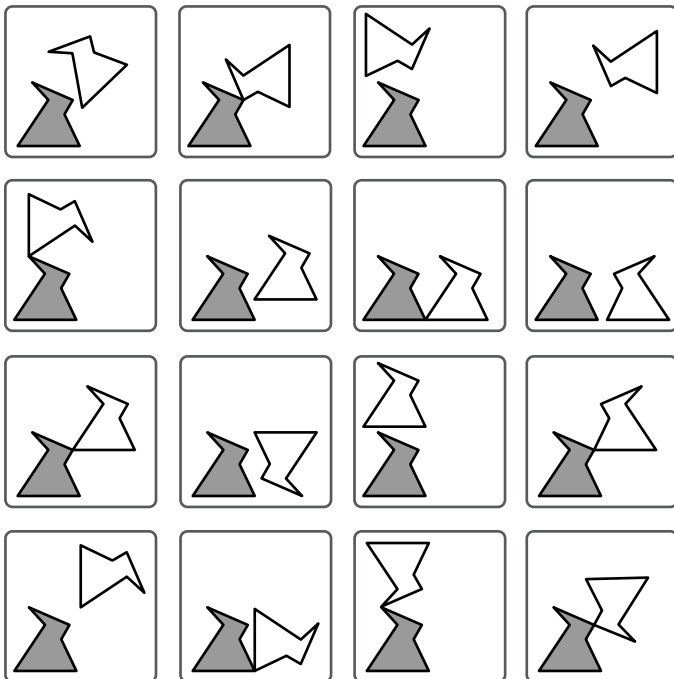
Round 1



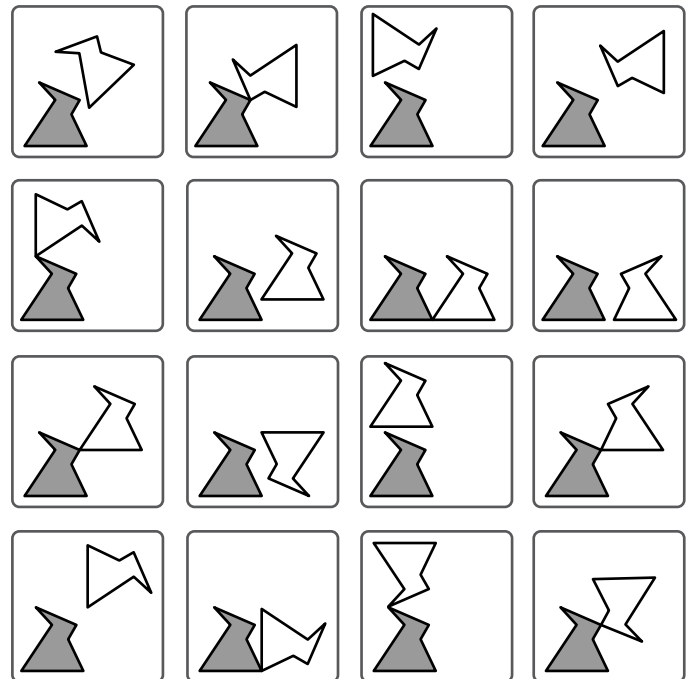
Round 2



Round 3

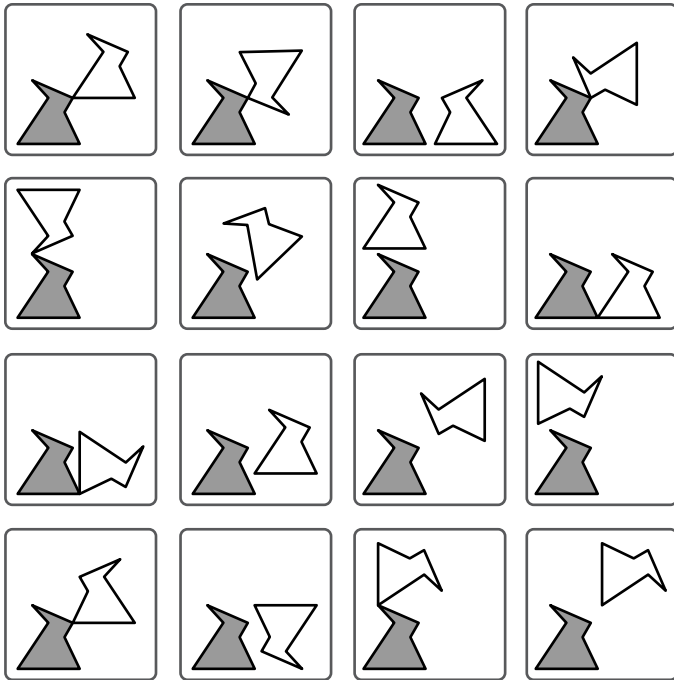


Round 4

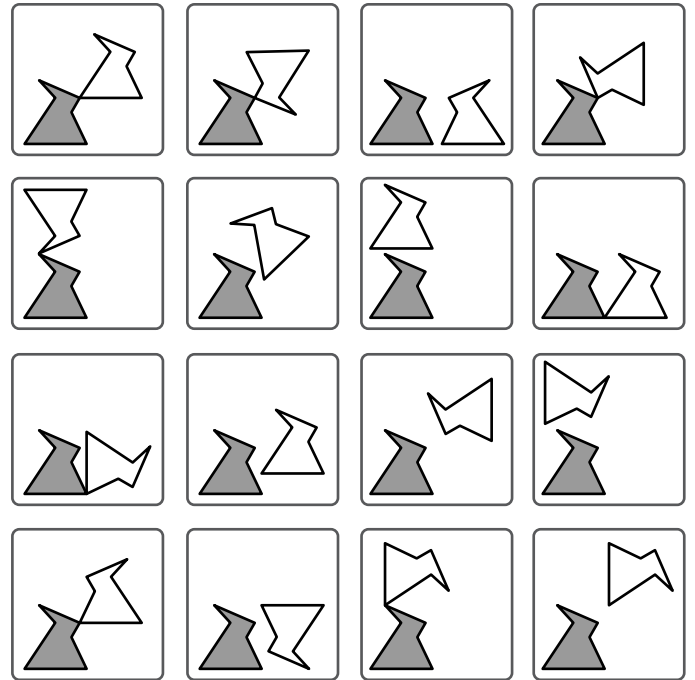


Polygraph Set B

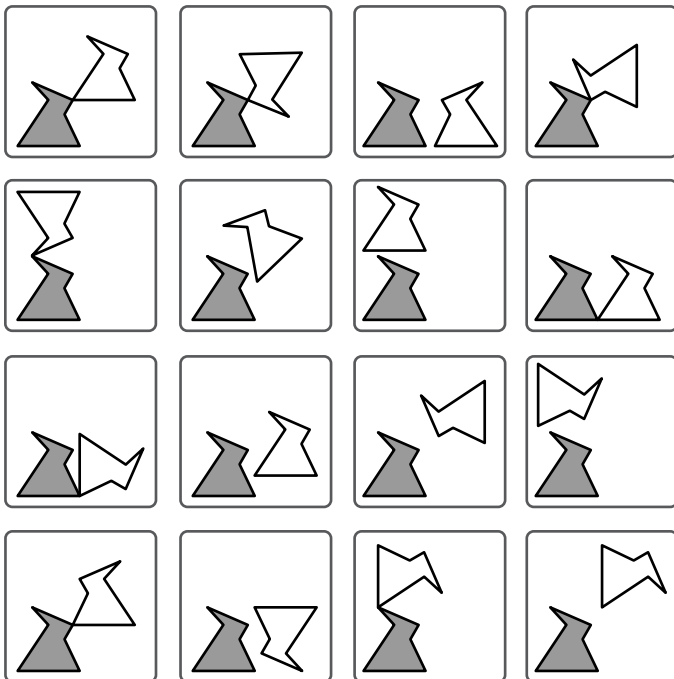
Round 1



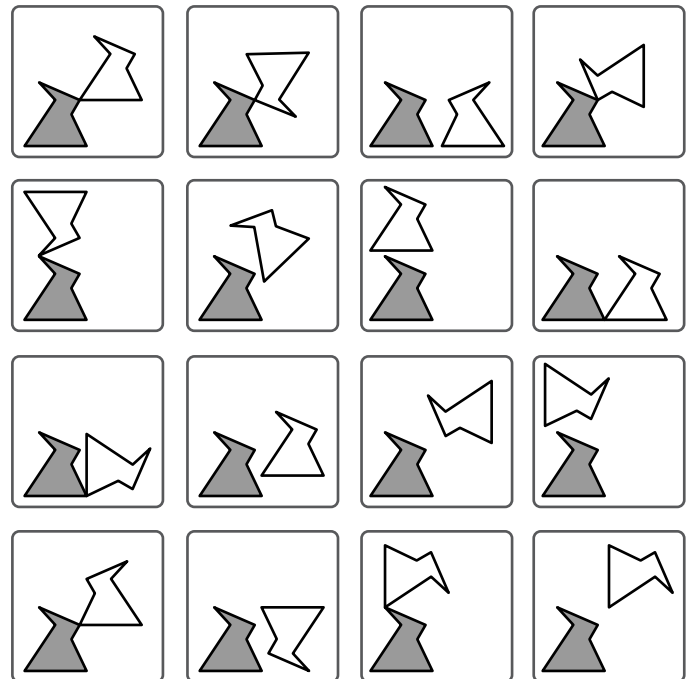
Round 2



Round 3



Round 4

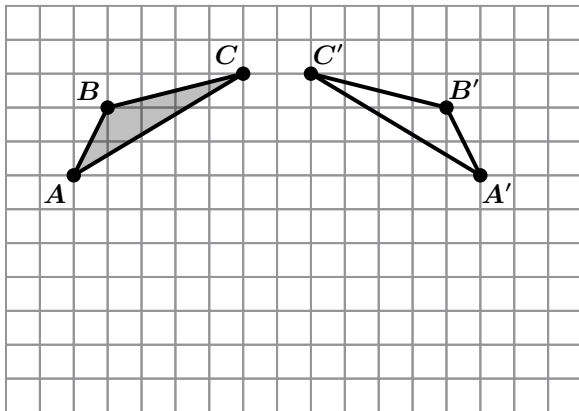


Transformation Information

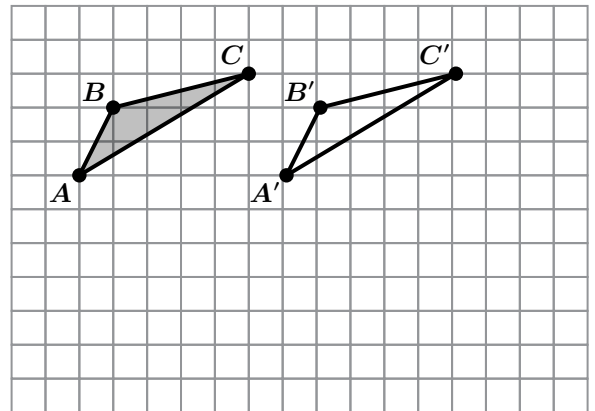
✂️ **Directions:** Make one copy per pair of students. Then pre-cut the cards and give each pair one set.

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM) and Open Up Resources.

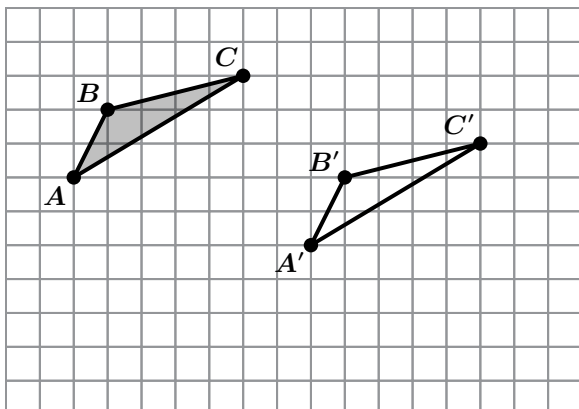
Card 1



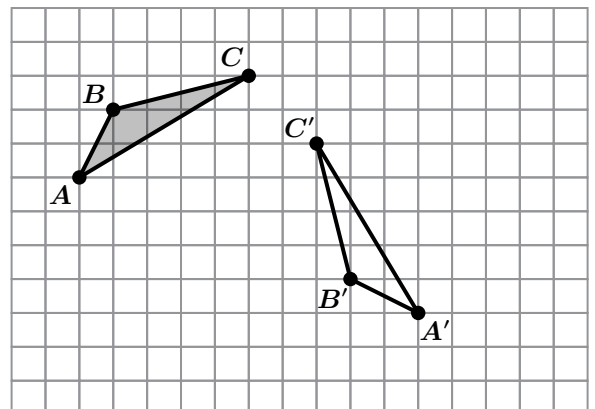
Card 2



Card 3



Card 4

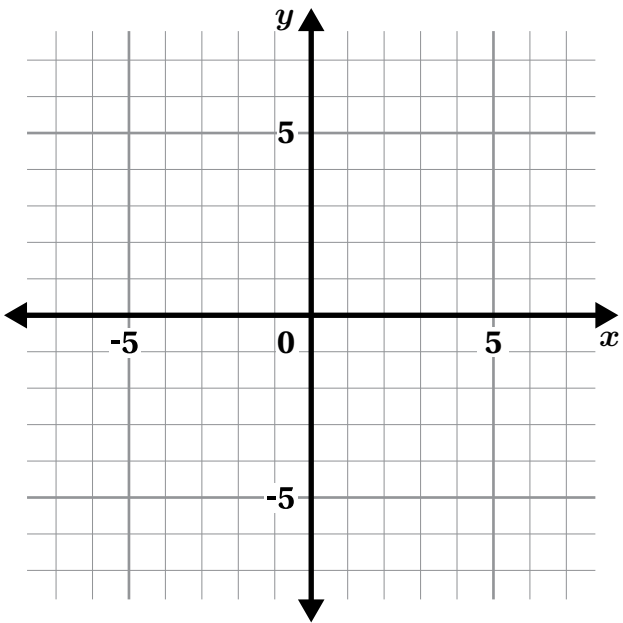


Name: Date: Period:

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:



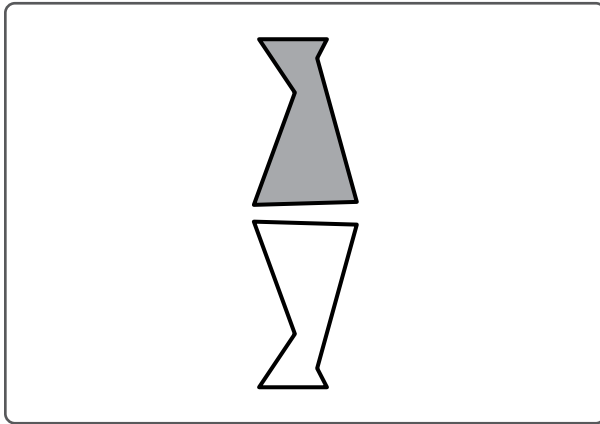
My Transformation:

Card Sort: Rigid Transformations

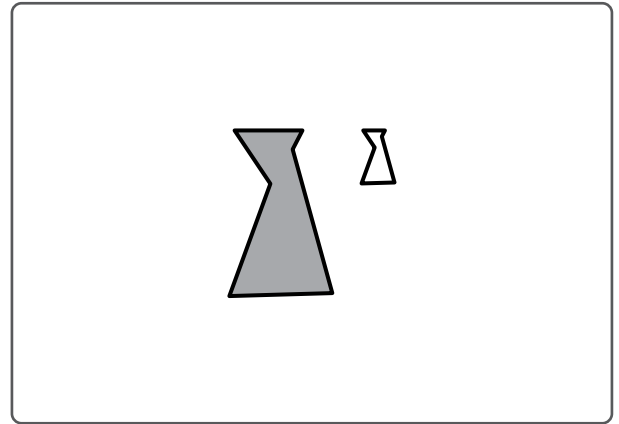
✂️ **Directions:** Make one copy per pair of students. Then pre-cut the cards and give each pair of students one set.

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM) and Open Up Resources.

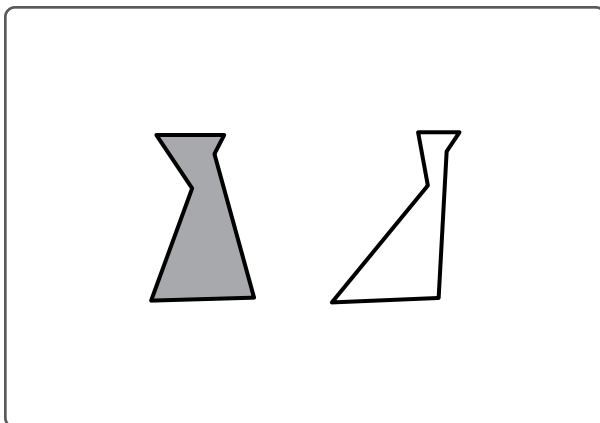
Card A



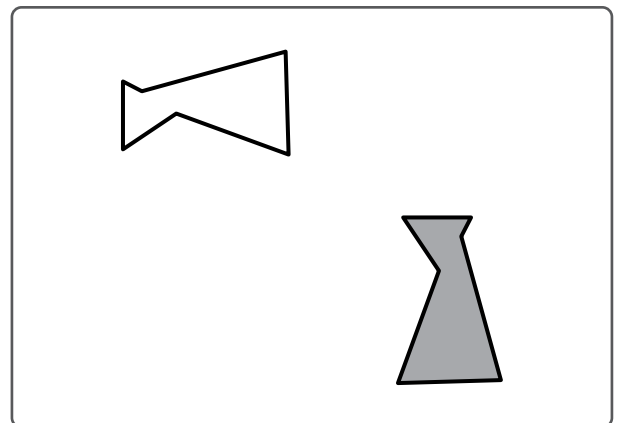
Card B



Card C



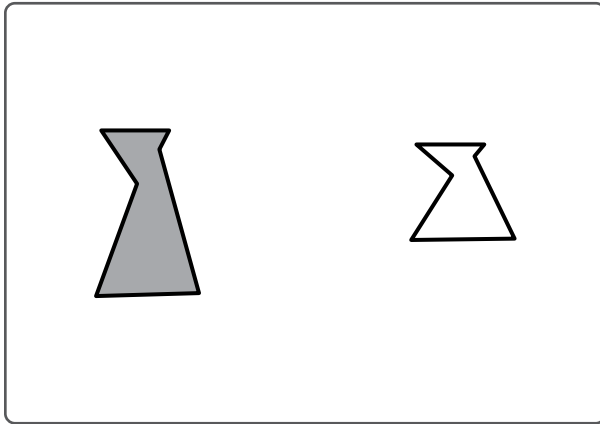
Card D



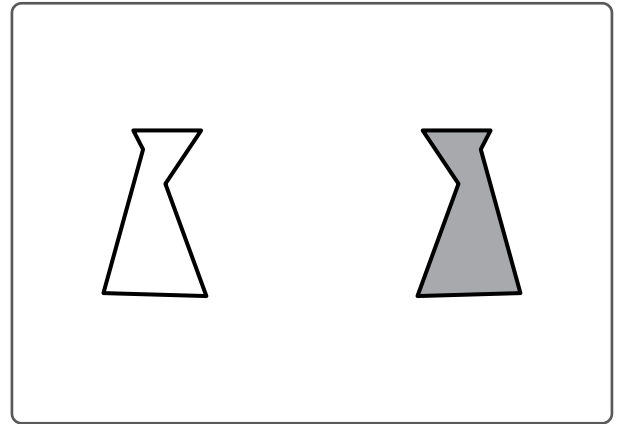
Card Sort: Rigid Transformations

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM) and Open Up Resources.

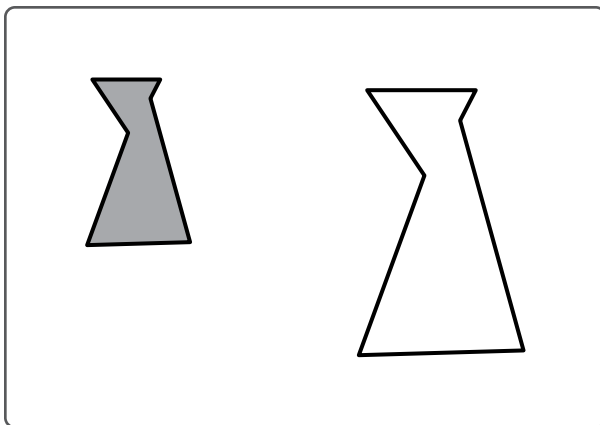
Card E



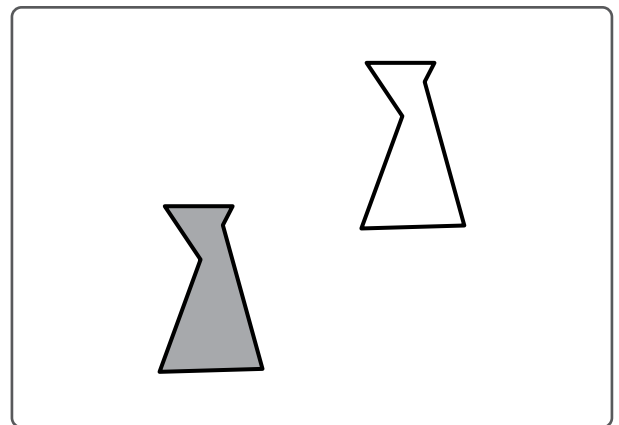
Card F




Card G



Card H

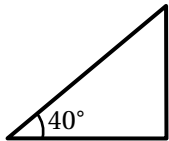


Find All Three

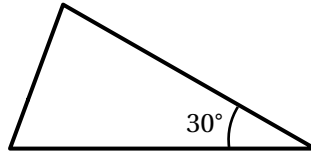
 **Directions:** Make one copy for every 36 students. Then pre-cut the cards and give each student one card.

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM) and Open Up Resources.

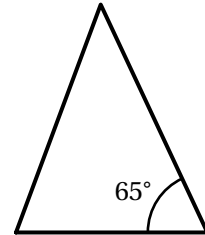
Card 1



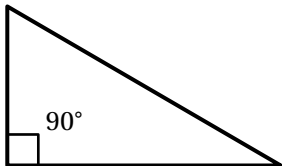
Card 2



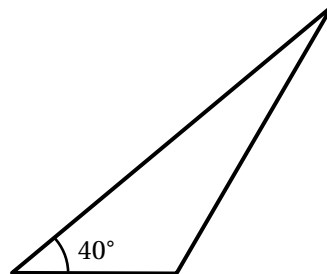
Card 3



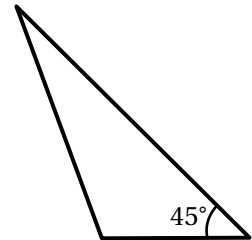
Card 4



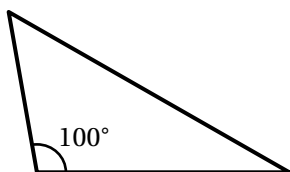
Card 5



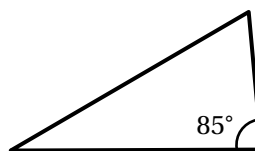
Card 6



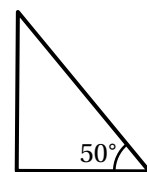
Card 7



Card 8



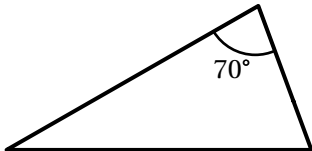
Card 9



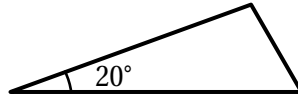
Find All Three

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM) and Open Up Resources.

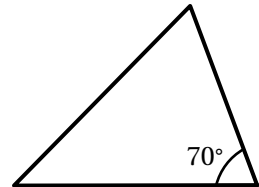
Card 10



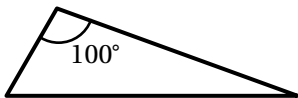
Card 11



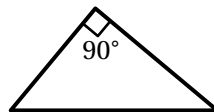
Card 12



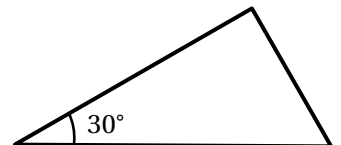
Card 13



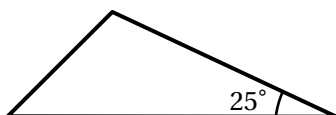
Card 14



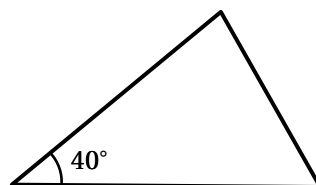
Card 15



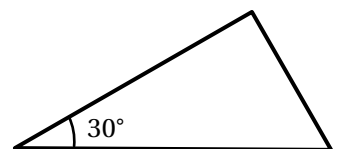
Card 16



Card 17



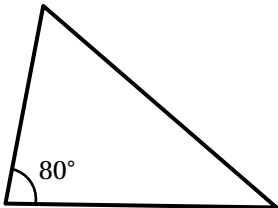
Card 18



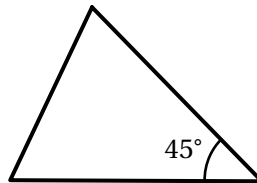
Find All Three

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM) and Open Up Resources.

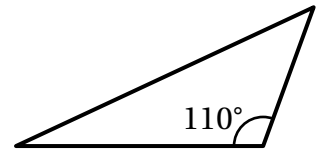
Card 19



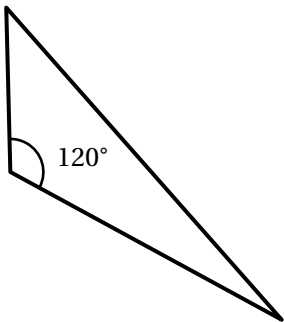
Card 20



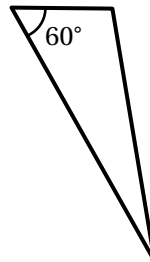
Card 21



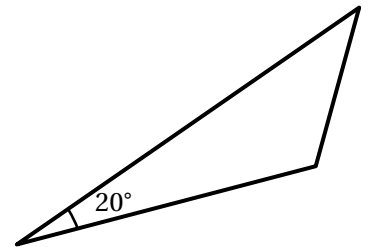
Card 22



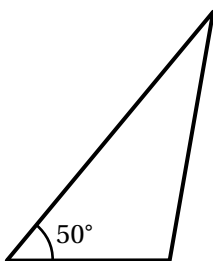
Card 23



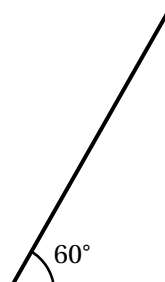
Card 24



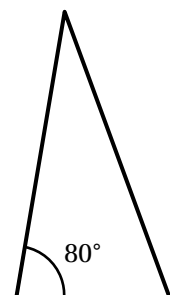
Card 25



Card 26



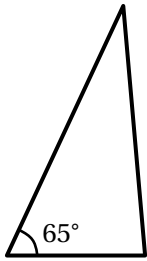
Card 27



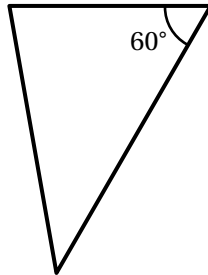
Find All Three

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM) and Open Up Resources.

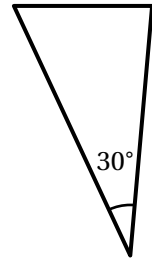
Card 28



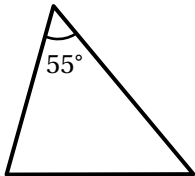
Card 29



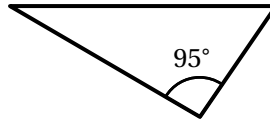
Card 30



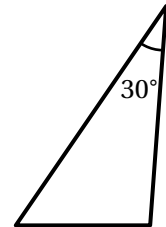
Card 31



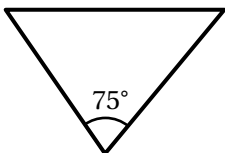
Card 32



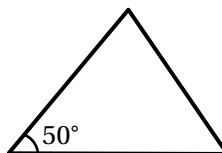
Card 33



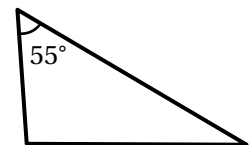
Card 34



Card 35



Card 36



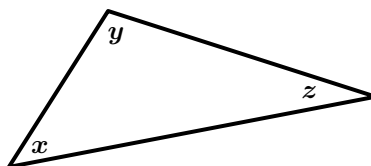
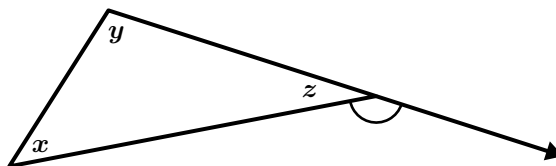
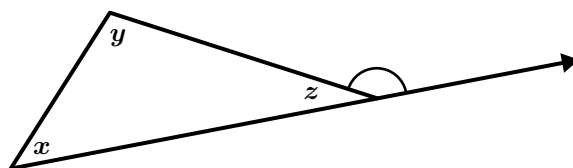
Tear It Up Again

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.

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM) and Open Up Resources.



Unit 2

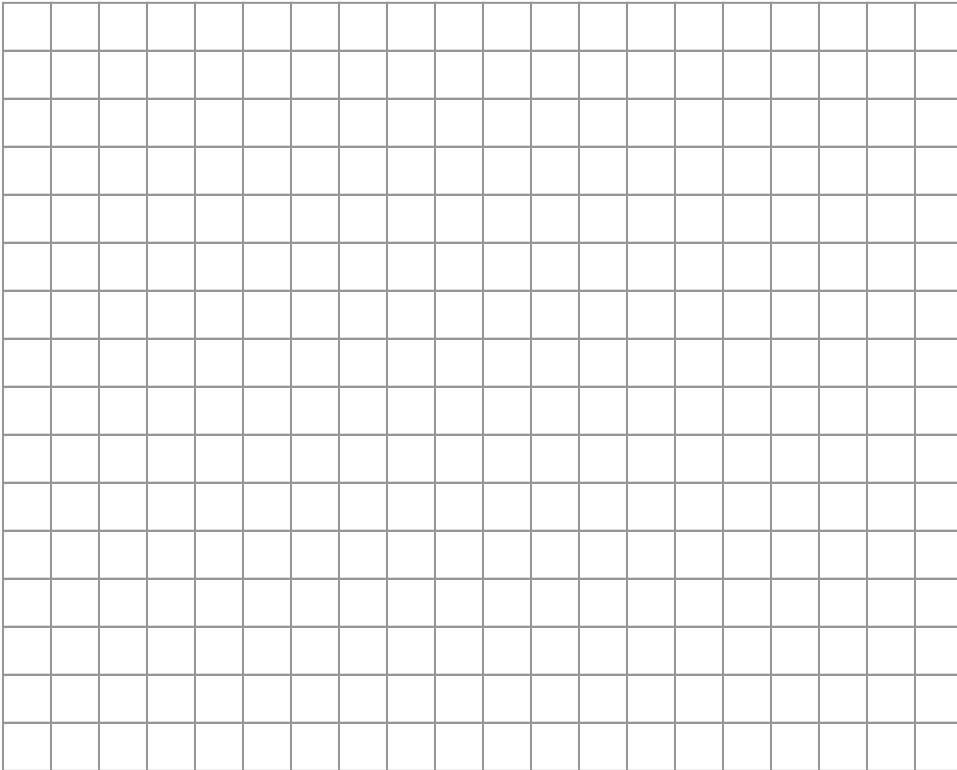
Activity Sheets and Cards

Name: Date: Period:

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: _____

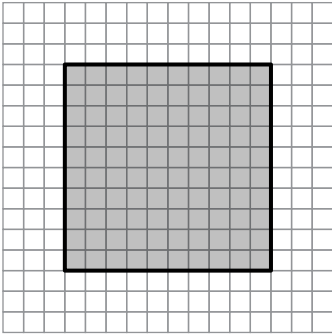


Card Sort: Scavenger Hunt

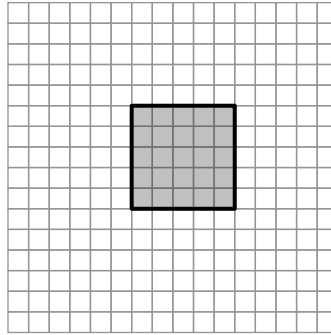
✂ **Directions:** Make one copy per class. Then pre-cut the cards and give each student one card.

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM) and Open Up Resources.

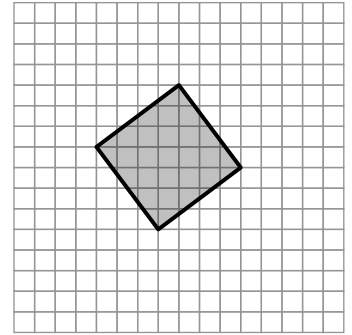
Card 1



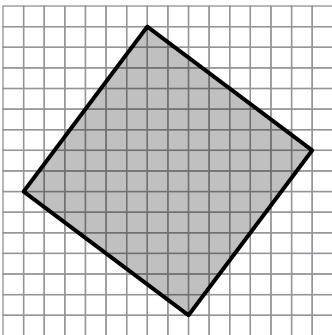
Card 2



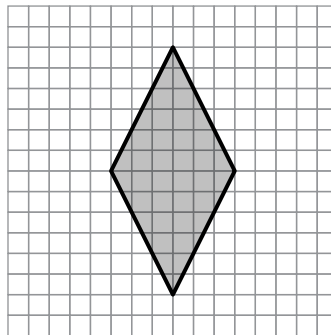
Card 3



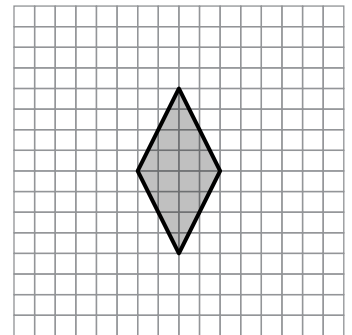
Card 4



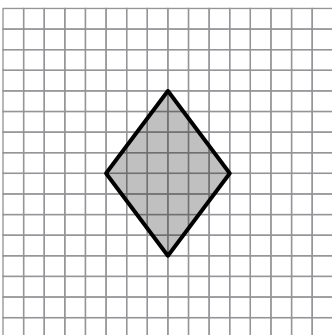
Card 5



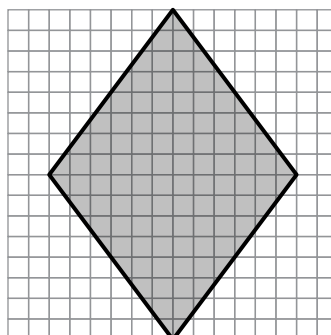
Card 6



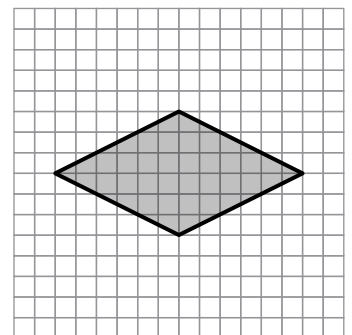
Card 7



Card 8



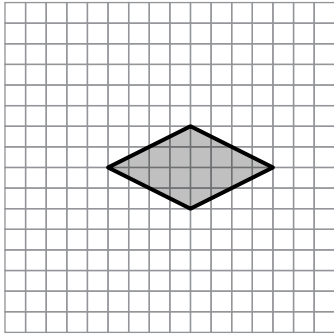
Card 9



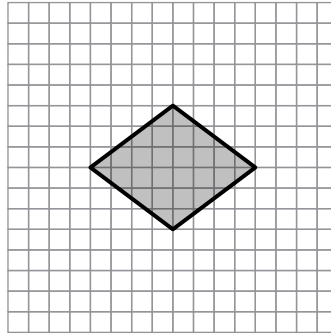
Card Sort: Scavenger Hunt

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM) and Open Up Resources.

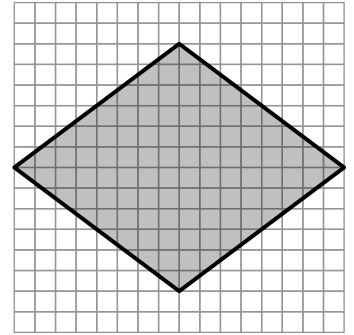
Card 10



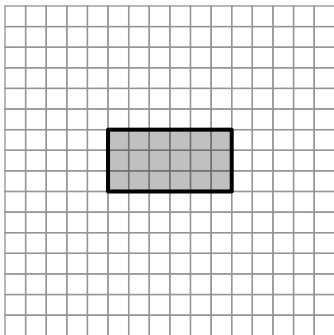
Card 11



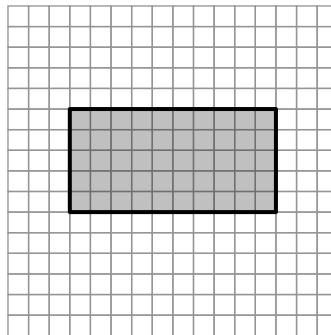
Card 12



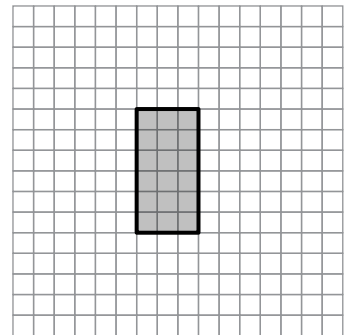
Card 13



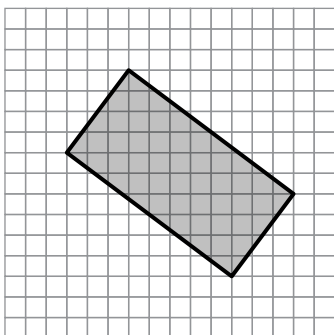
Card 14



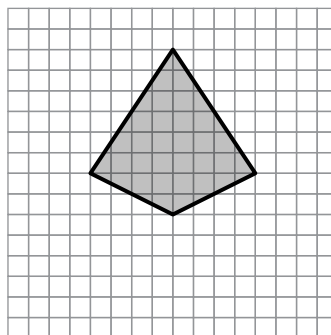
Card 15



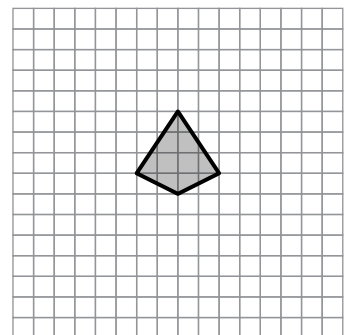
Card 16



Card 17



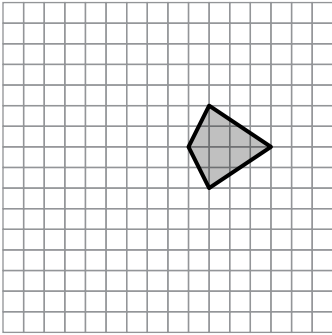
Card 18



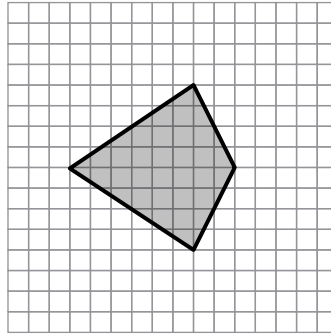
Card Sort: Scavenger Hunt

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM) and Open Up Resources.

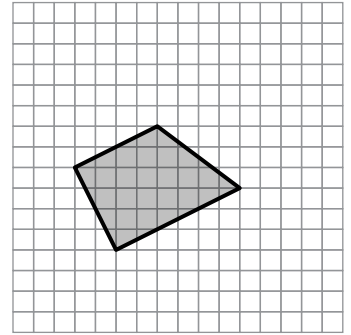
Card 19



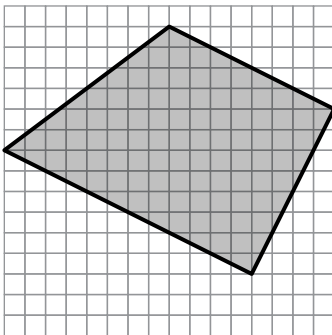
Card 20



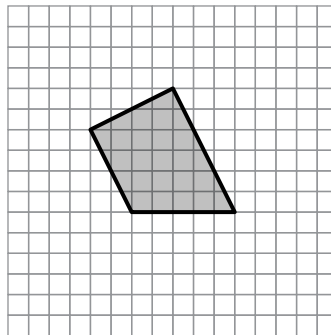
Card 21



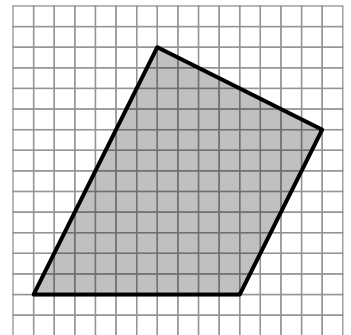
Card 22



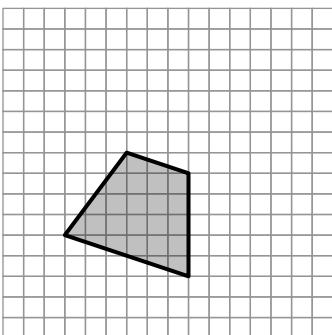
Card 23



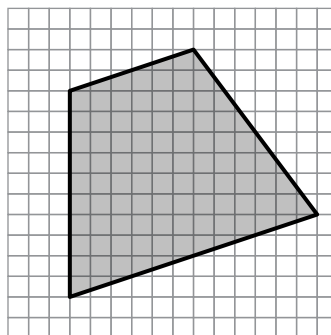
Card 24



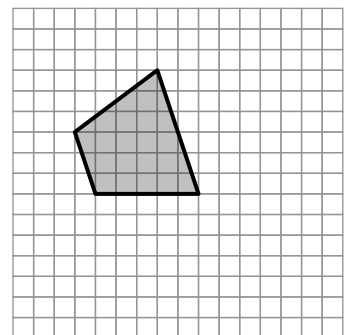
Card 25



Card 26



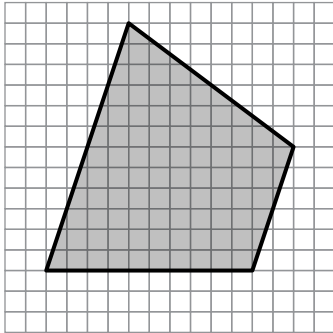
Card 27



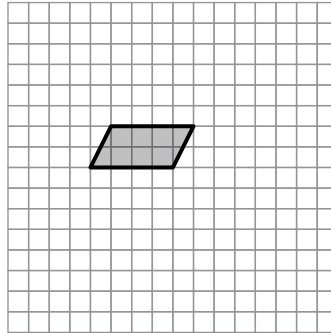
Card Sort: Scavenger Hunt

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM) and Open Up Resources.

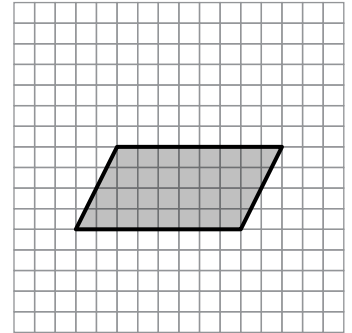
Card 28



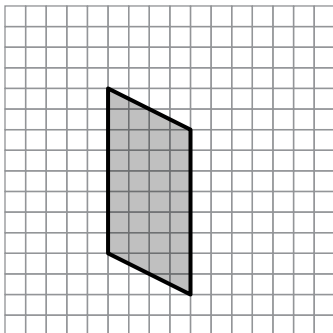
Card 29



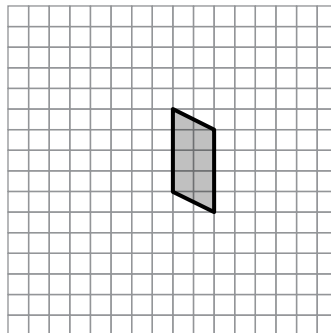
Card 30



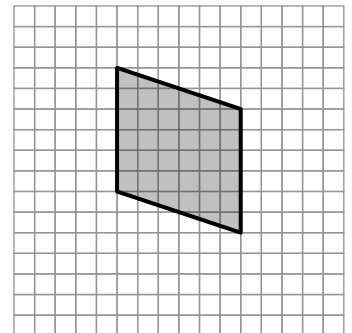
Card 31



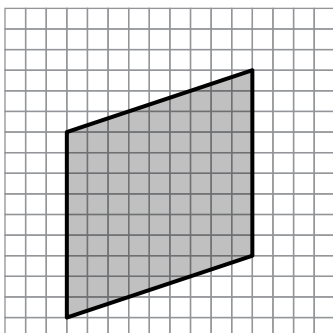
Card 32



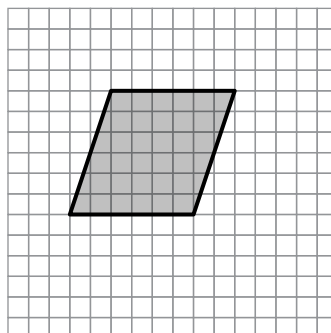
Card 33



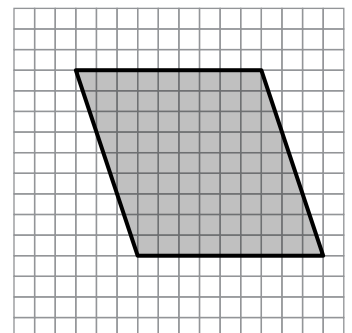
Card 34



Card 35



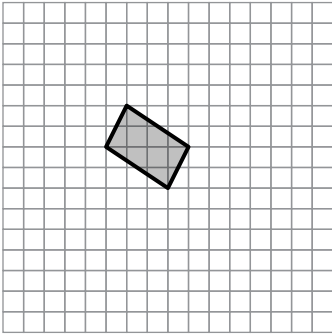
Card 36



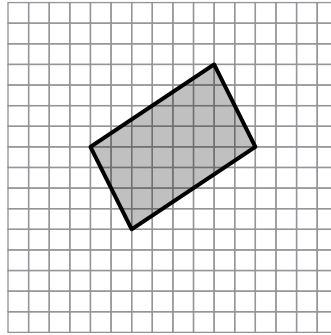
Card Sort: Scavenger Hunt

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM) and Open Up Resources.

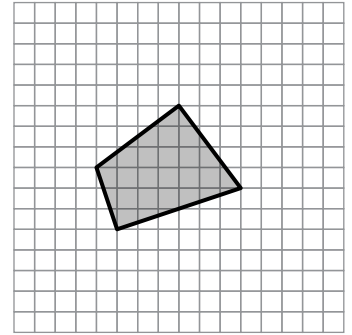
Card 37



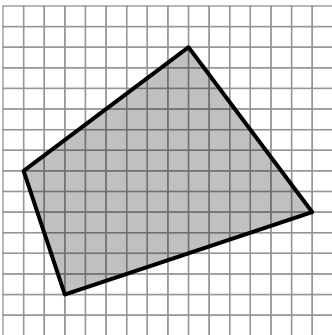
Card 38




Card 39



Card 40

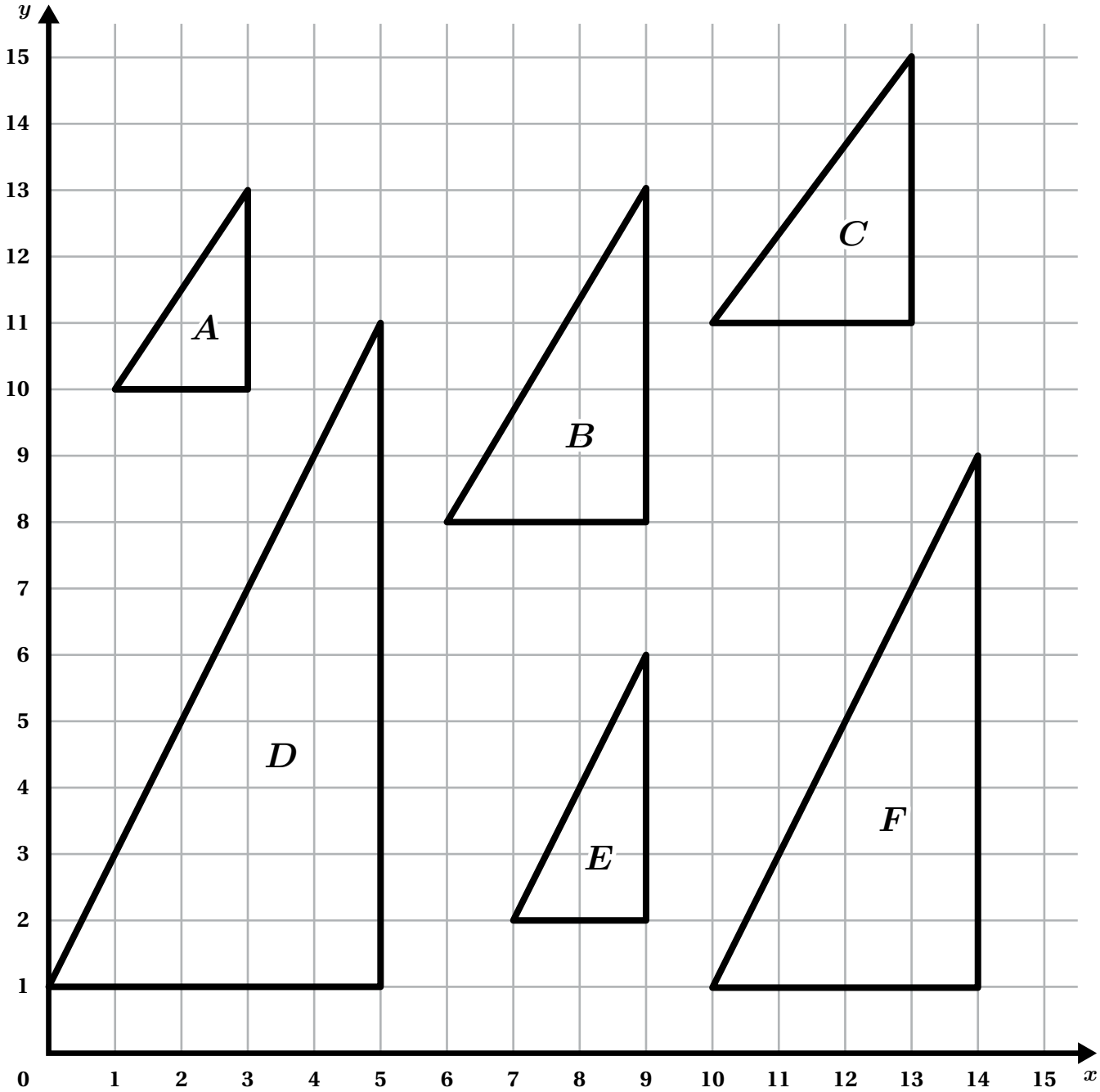


Straight Water Slide

 **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.

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM) and Open Up Resources.



Unit 3

Activity Sheets and Cards

Comparing Two Different Representations

Choose one of the situations. Then complete the problems by creating a poster.

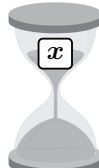
Situation A: Maki and Ren

Maki babysits a neighbor's children. Ren mows another neighbor's lawn.

- a Who makes more money after working 12 hours? Show or explain your thinking.
- b What is the rate of change for each situation and what does it mean?
- c How long would it take each person to earn \$150? Show or explain your thinking.


MAKI'S EARNINGS

$y = 8.40x$



x

of hours worked



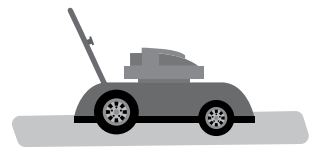
y

Amount of money earned

REN EARNS:

$\$7$

PER HOUR



Mowing his neighbor's lawn

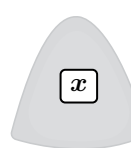
Situation B: Ahmed's Lemonade

Ahmed plans to start a lemonade stand and is trying to perfect the recipe.

- a If Ahmed has 16 cups of lemonade mix, how many cups of water are needed for each recipe?
- b What is the rate of change for each situation and what does it mean?
- c Ahmed has 5 gallons (80 cups) of water and 20 cups of lemonade mix. Which lemonade recipe should Ahmed use? Show your thinking.


LEMONADE RECIPE 1

$y = 4x$



x

Amount of lemonade mix in cups



y

Amount of water in cups

LEMONADE RECIPE 2

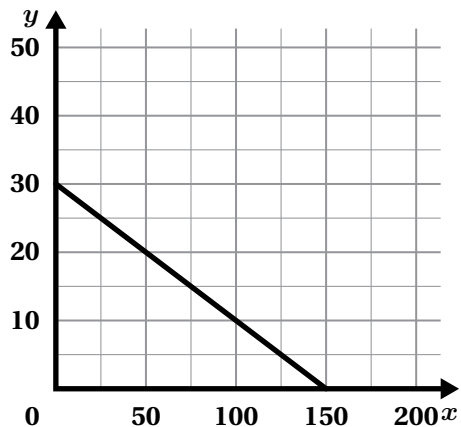
Lemonade mix (cups)	Water (cups)
10	50
13	65
21	105

Matchmaker

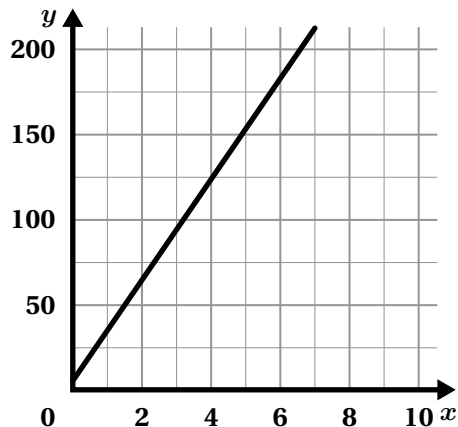
✂️ **Directions:** Make one copy per pair of students. Then pre-cut the cards and give each pair one set.

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM) and Open Up Resources.

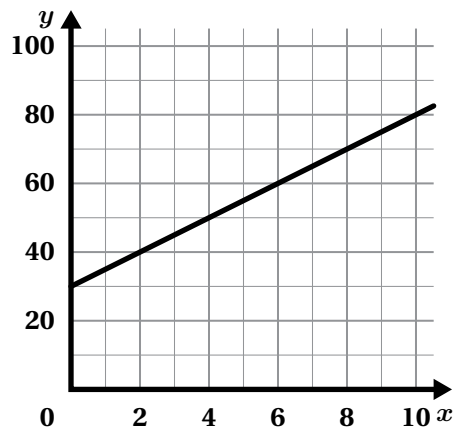
Graph A



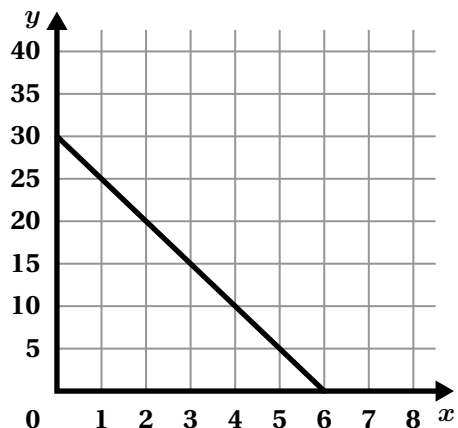
Graph B



Graph C

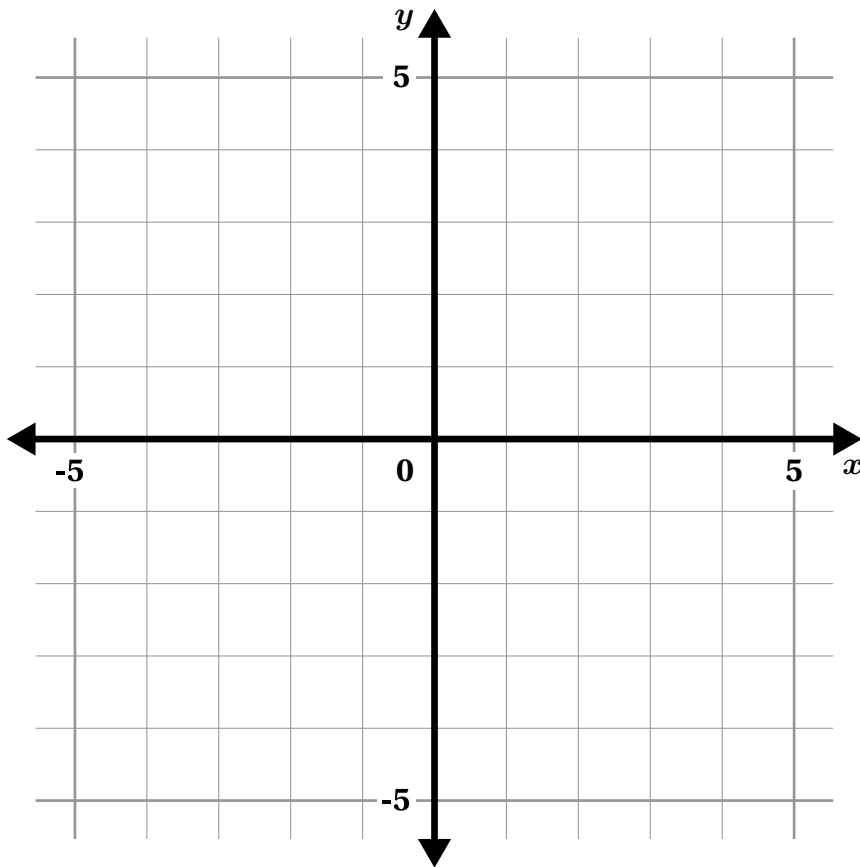


Graph D



Challenge Creator


Draw 8 coins on the graph.



Unit 4

**Activity Sheets
and Cards**

Equation Roundtable

 **Directions:** Make one copy per group. Then pre-cut the cards and give each group one set.

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM) and Open Up Resources.


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.

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM) and Open Up Resources.

Card 3

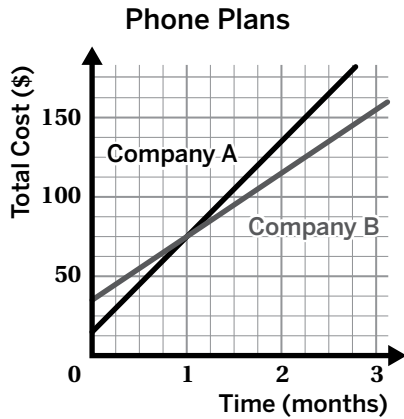
$$\frac{3}{4}x + 7 = x + 13$$

Card 4

$$-4x + 14 = 2(x + 7)$$

Challenge Creator

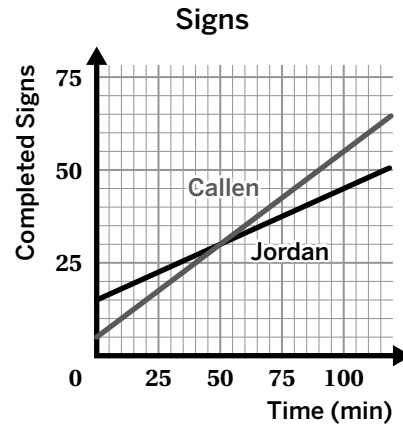
- Select *one* situation to focus on.
- Fill in the statement to describe a single point anywhere on the graph.



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.

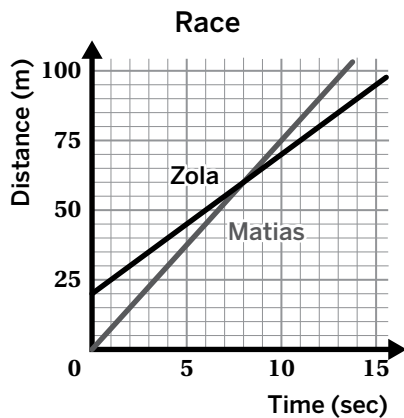
Statement: At _____ months, the cost of my phone plan is _____.



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.

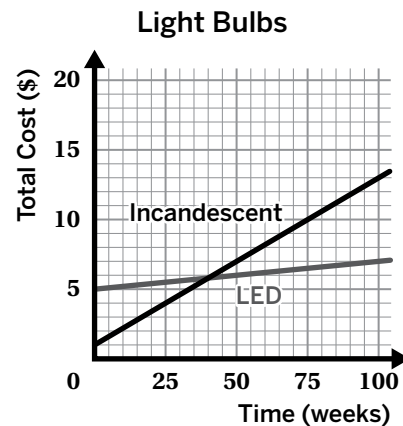
Statement: At _____ minutes, _____ signs were made.



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.

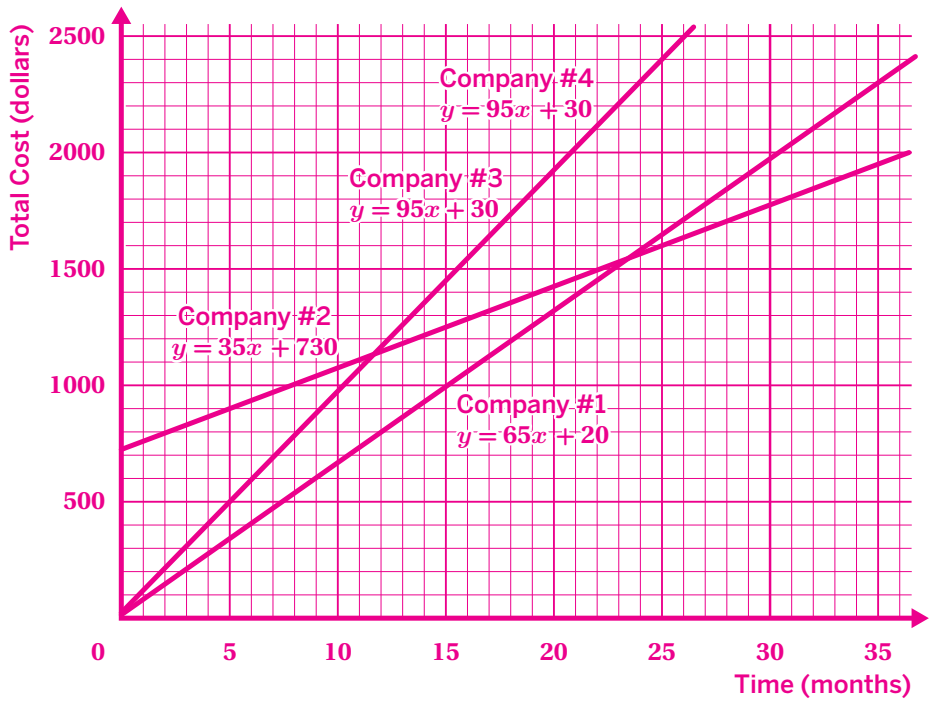


Traditional incandescent bulbs are cheaper to purchase, but they use more energy compared to LED bulbs.

- 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 _____.

On Both Lines (answers)



Unit 5

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.

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM) and Open Up Resources.

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

$$x = 5$$

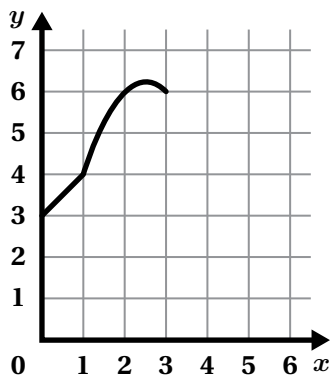
H

$$2y + 3x = 10$$

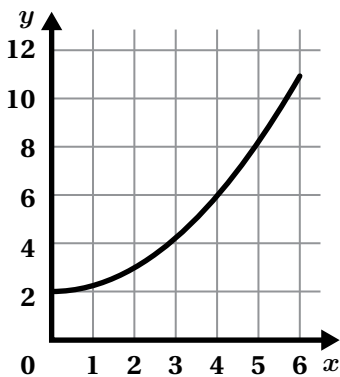
I

$$y = 9x^3$$

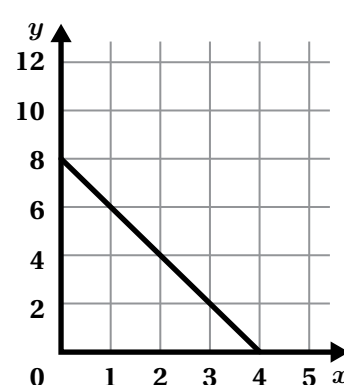
J



K



L



Unit 6

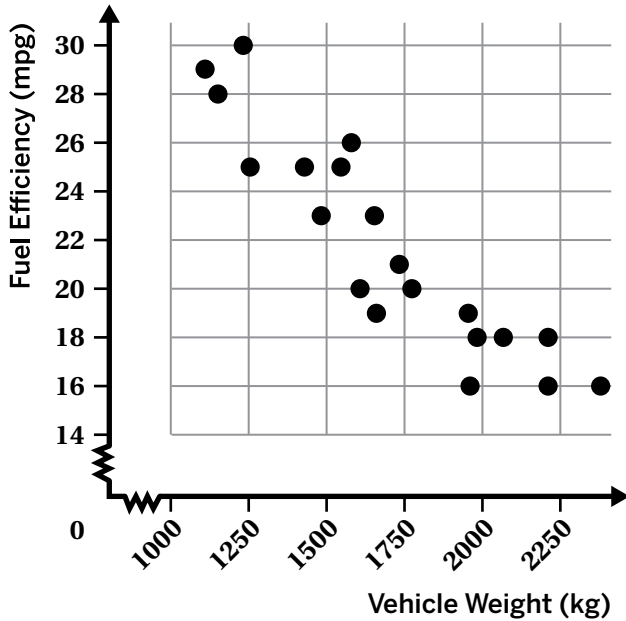
**Activity Sheets
and Cards**

Challenge Creator

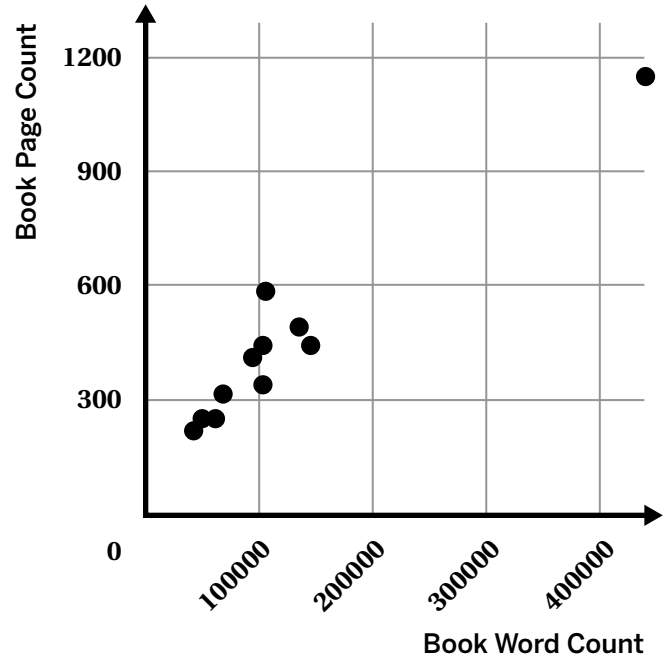
✂️ **Directions:** Make one copy for each group of students. Then pre-cut the cards and give each group one set.

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM) and Open Up Resources.

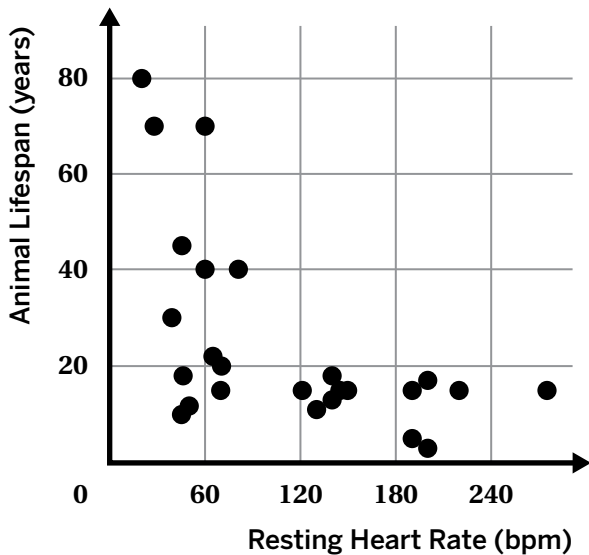
Fuel Efficiency



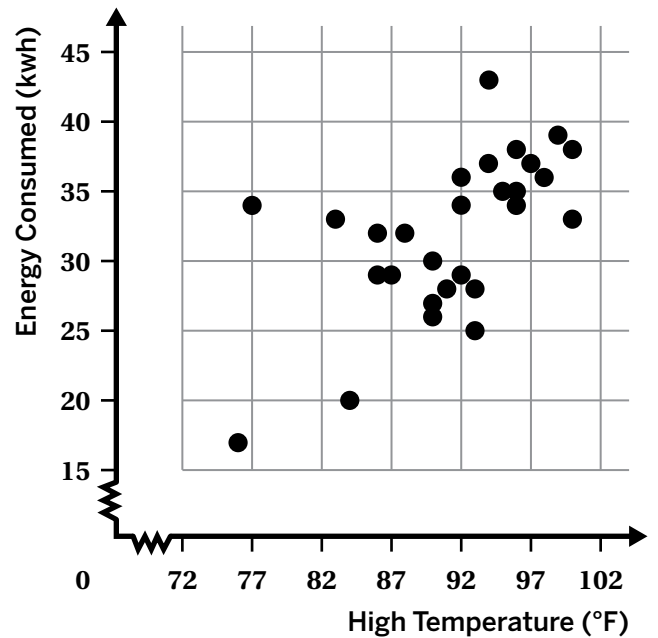
Book Page Count



Animal Lifespan



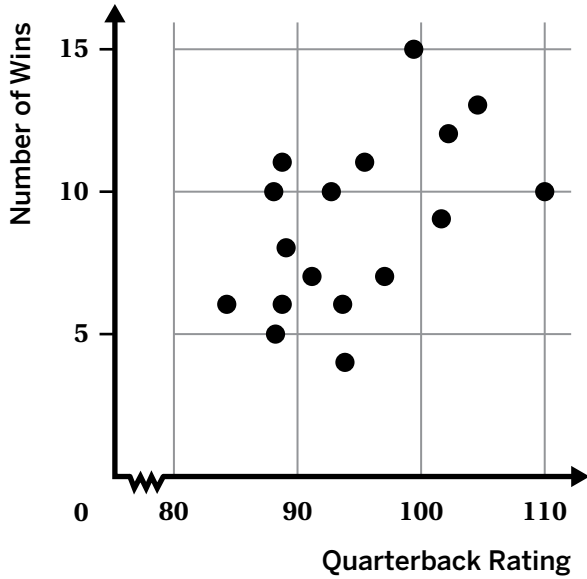
Energy Use



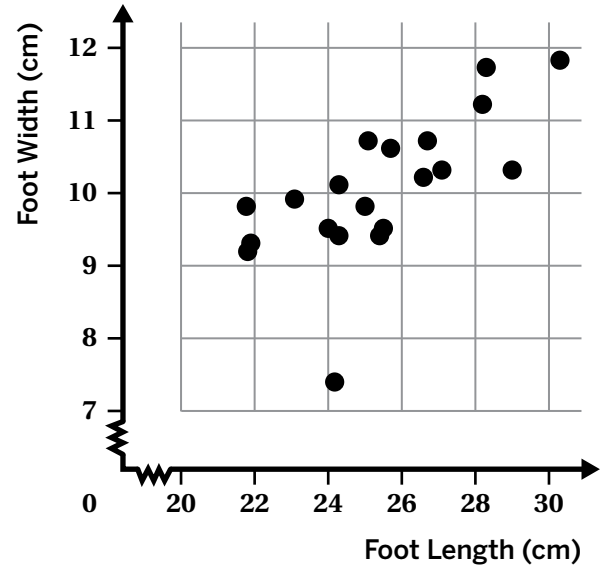
Challenge Creator

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM) and Open Up Resources.

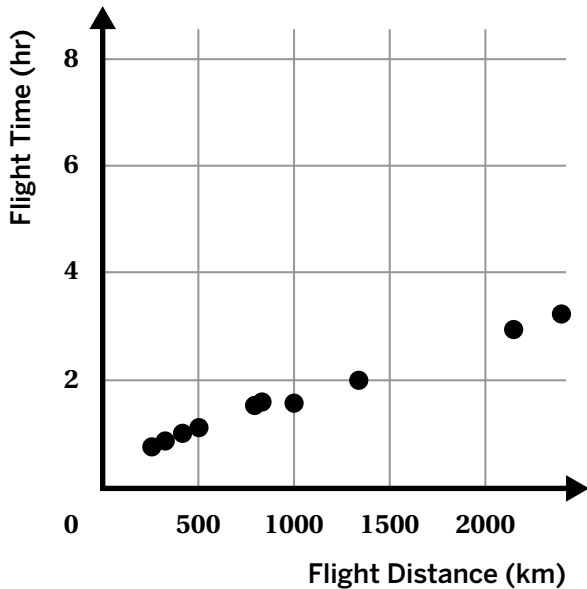
Quarterback Wins



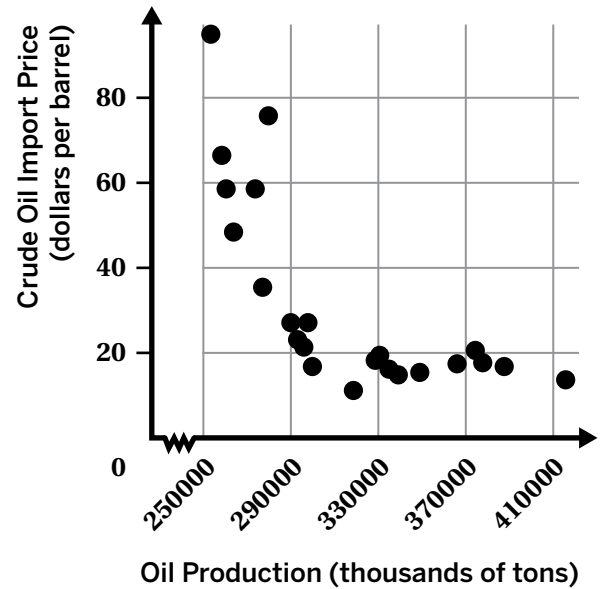
Foot Width



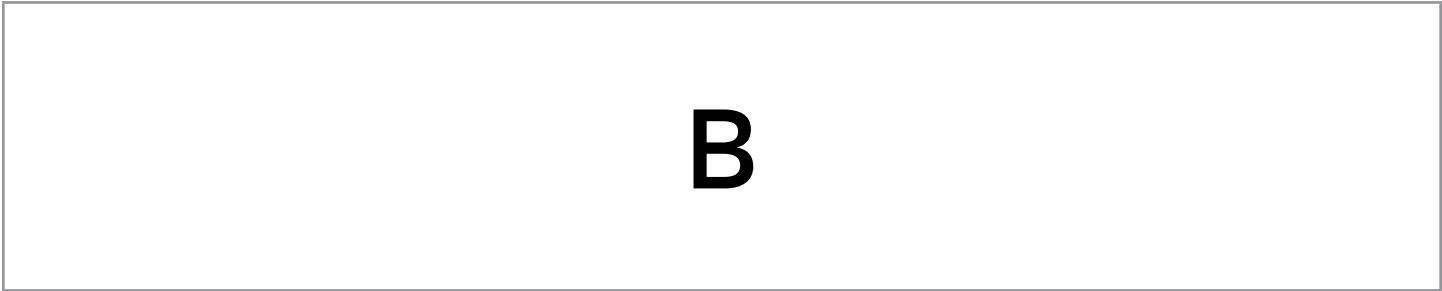
Flight Time



Oil Imports

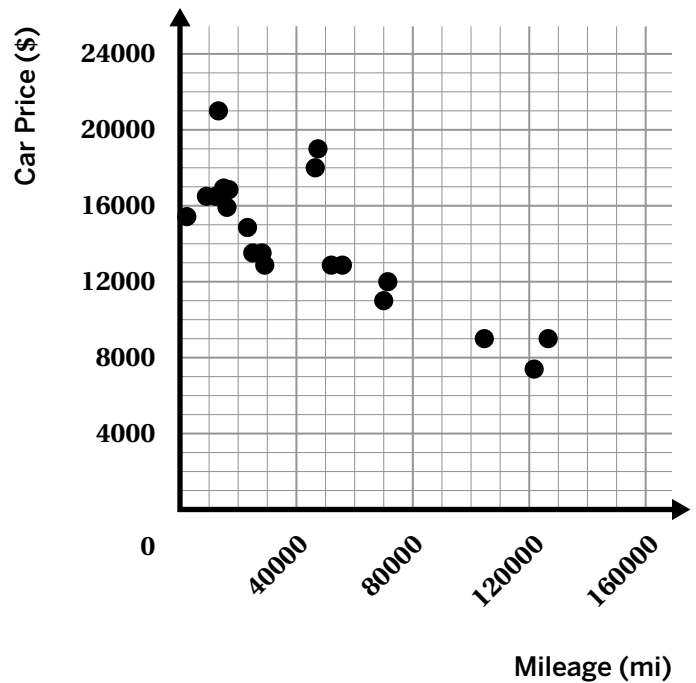


Scavenger Hunt Trapezoid Sheet



Problem:

Based on this data, approximately what is the cost of a car with 60,000 miles?



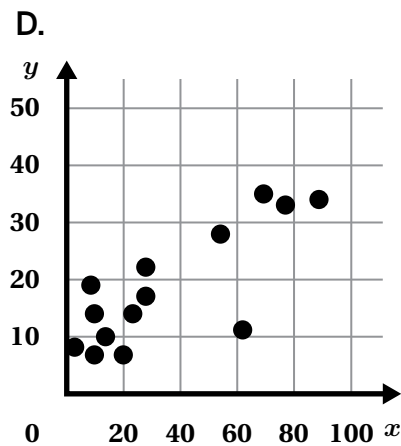
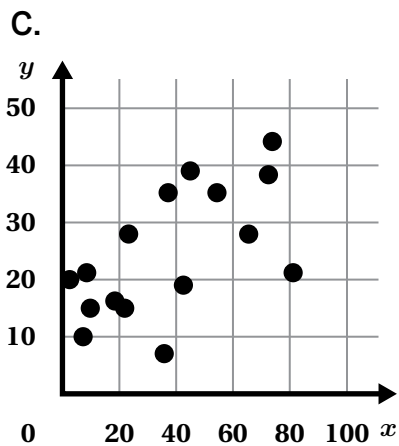
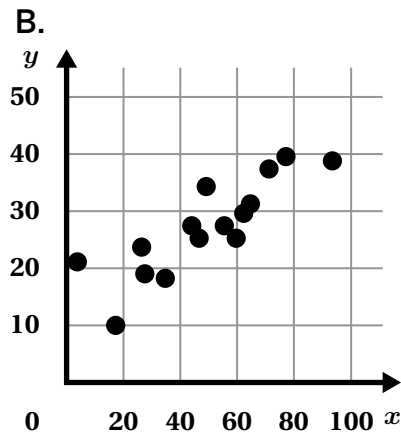
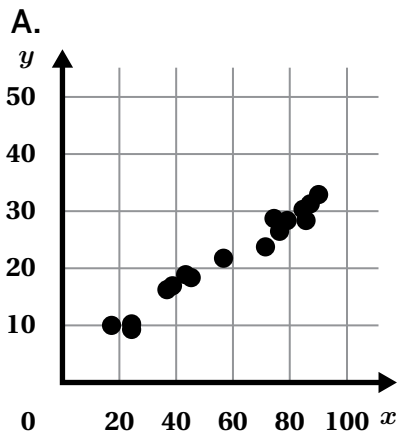
Scavenger Hunt Circle Sheet

Answer

12,000

Problem:

Which scatter plot matches the table?



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

Scavenger Hunt

 Pentagon Sheet

Answer

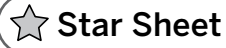
C

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

Scavenger Hunt



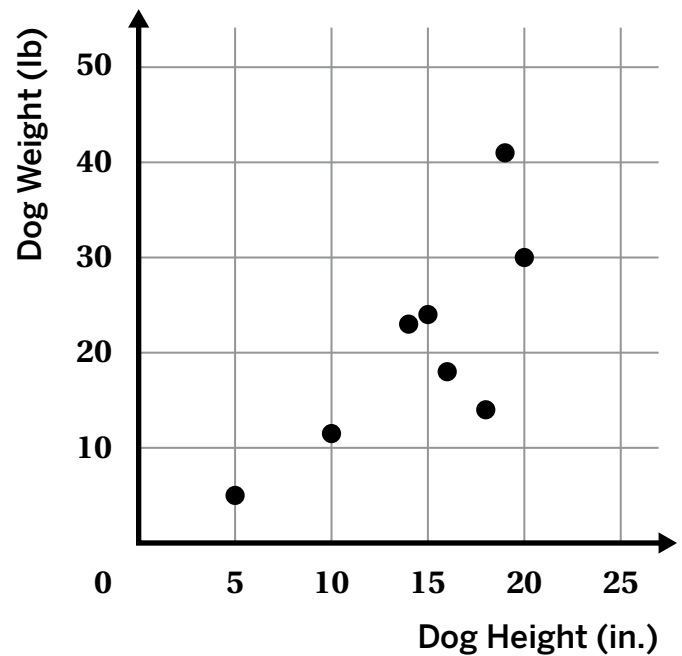
Answer

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?

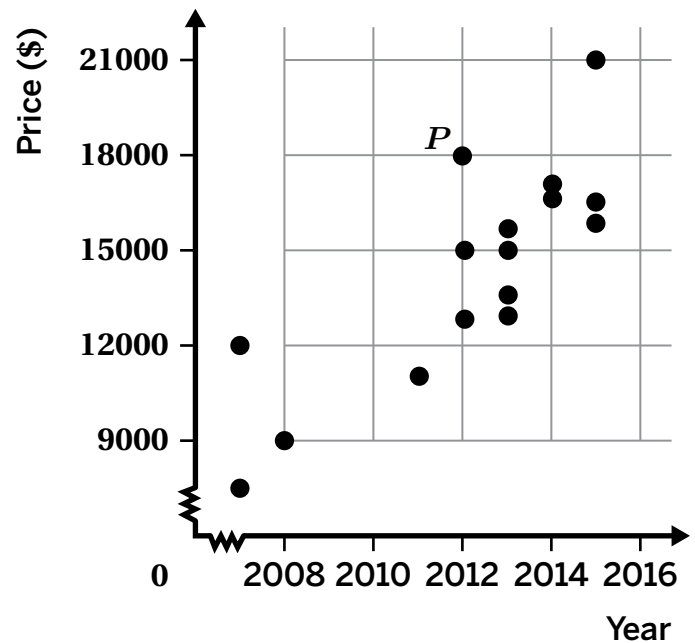


Scavenger Hunt Rectangle Sheet

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.



Scavenger Hunt △ Triangle Sheet

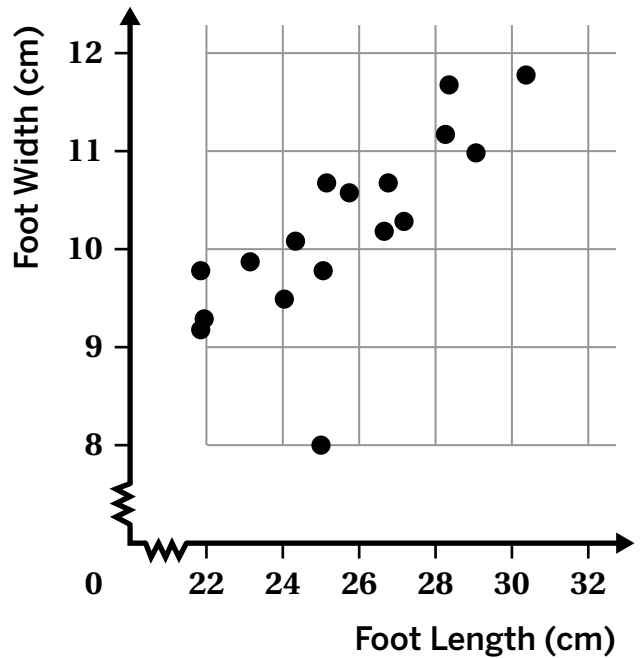
Answer

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?



Scavenger Hunt

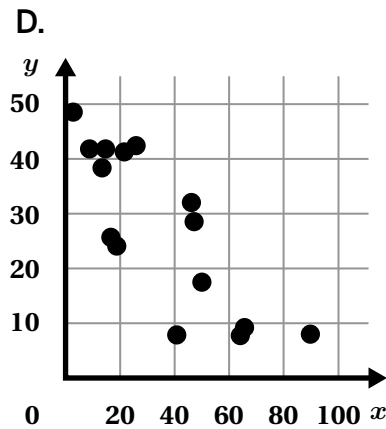
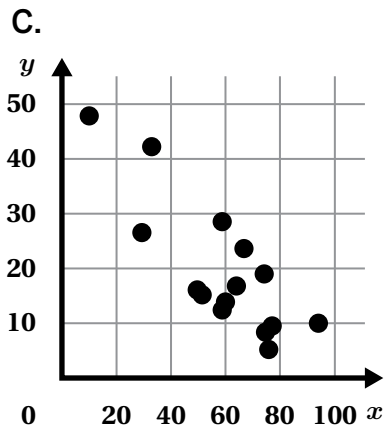
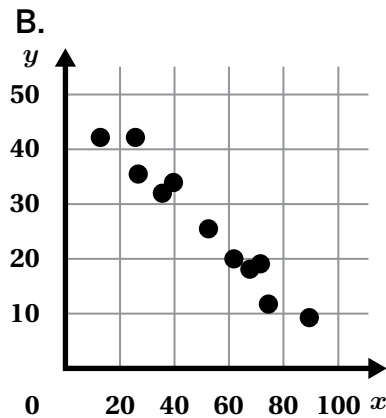
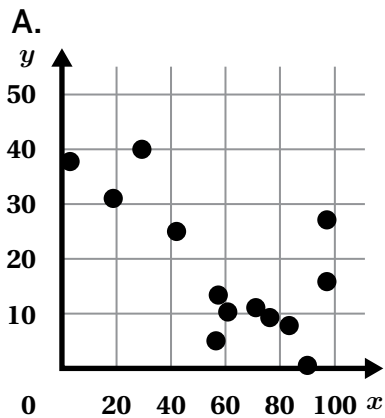


Answer

25

Problem:

Which scatter plot matches the table?



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

Scavenger Hunt



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

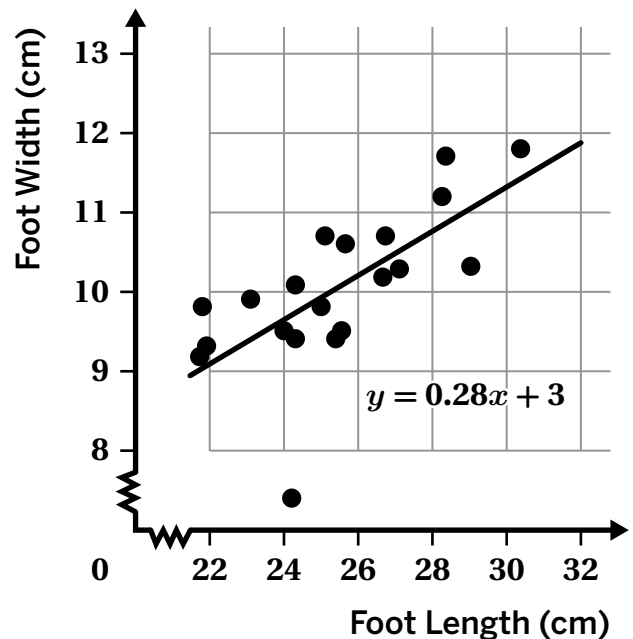
Scavenger Hunt  Hexagon Sheet

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.

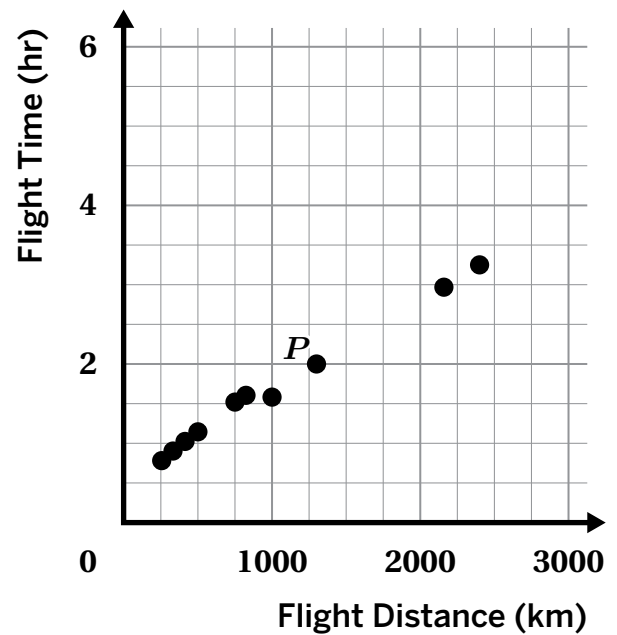


Scavenger Hunt Oval Sheet

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.

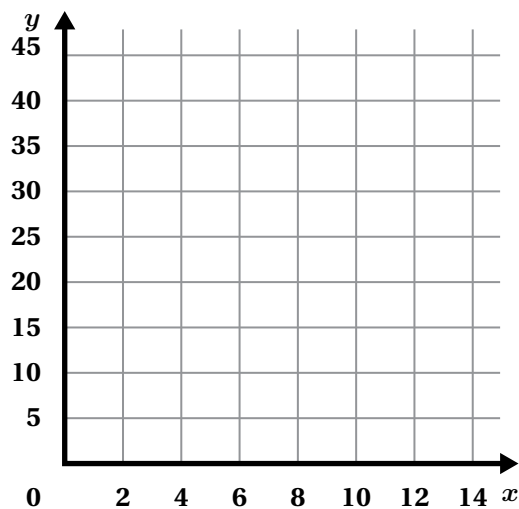
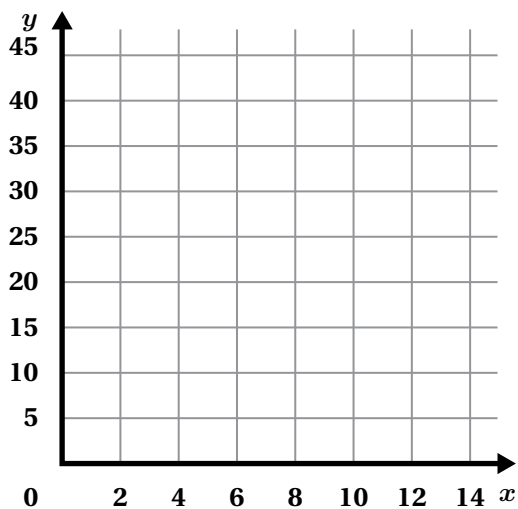
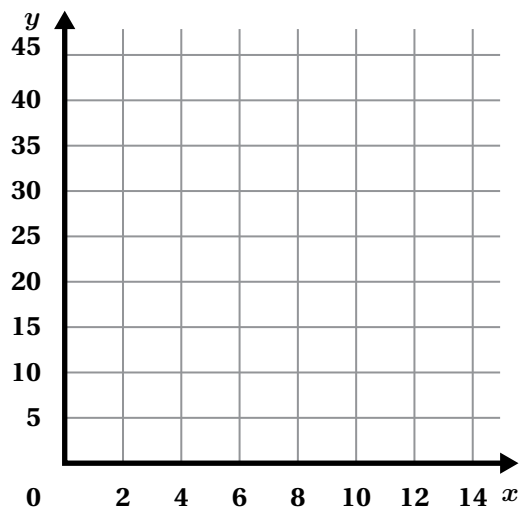
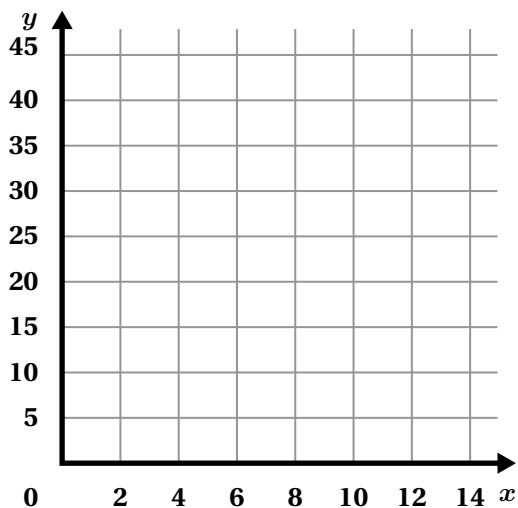


Name: _____ Date: _____ Period: _____

Challenge Creator

Create scatter plot challenges by completing these steps.

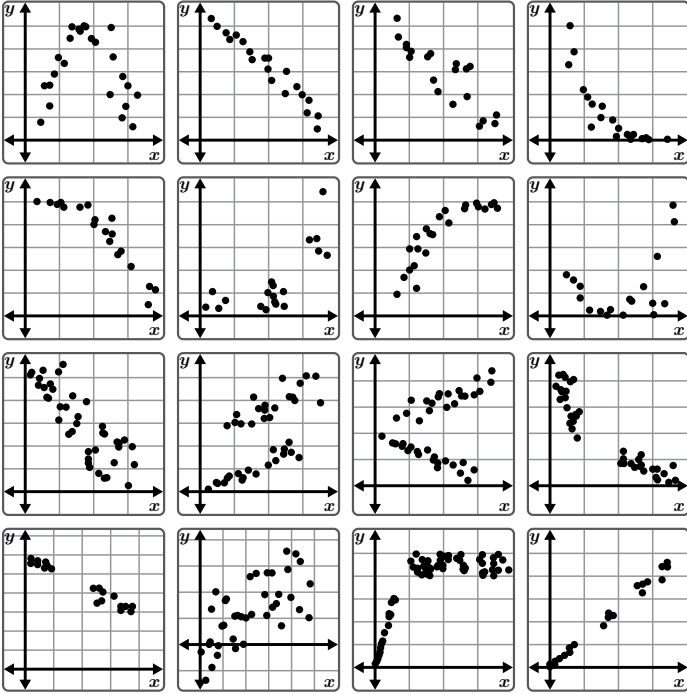
- Create a scatter plot with at least ten points.
- Pass your scatter plot to another student.
- Draw a line of fit for the data you received.
- Create a new scatter plot in the next available space.
- Repeat steps until everyone has drawn lines for four scatter plots.



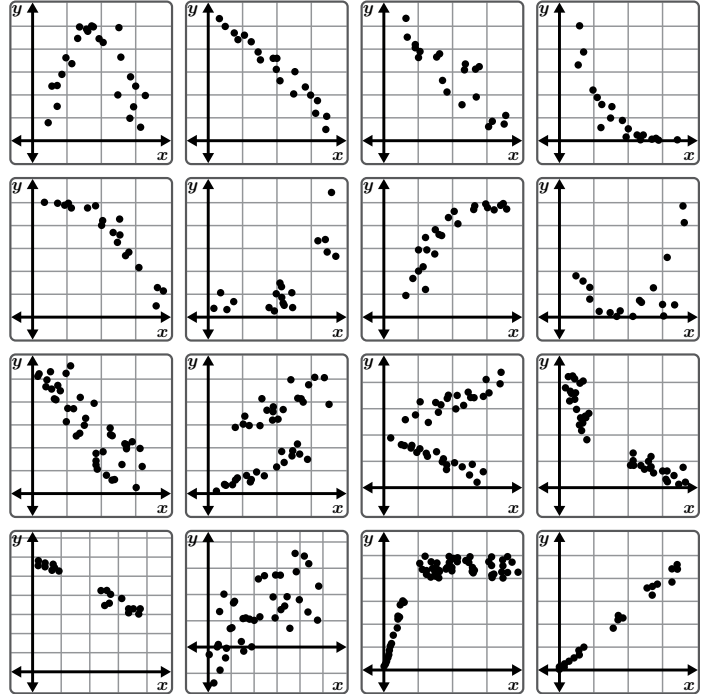
Name: _____ Date: _____ Period: _____

Polygraph Set A

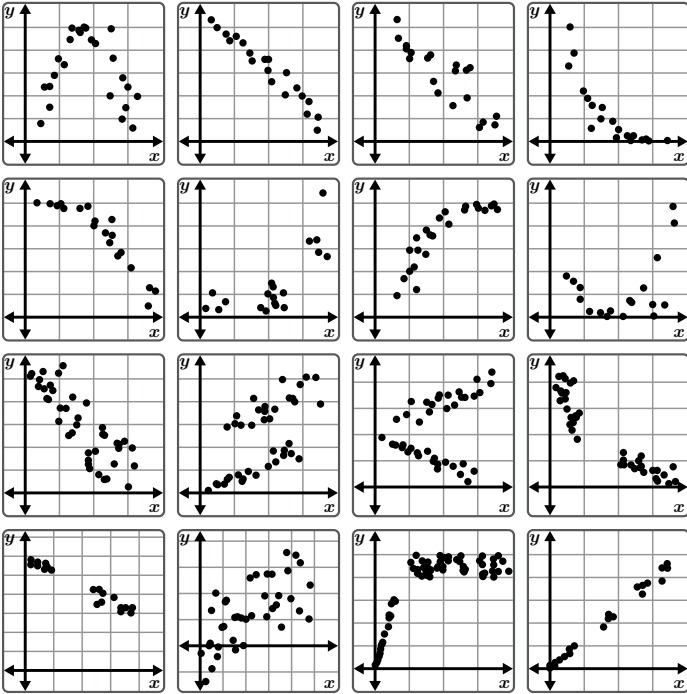
Round 1



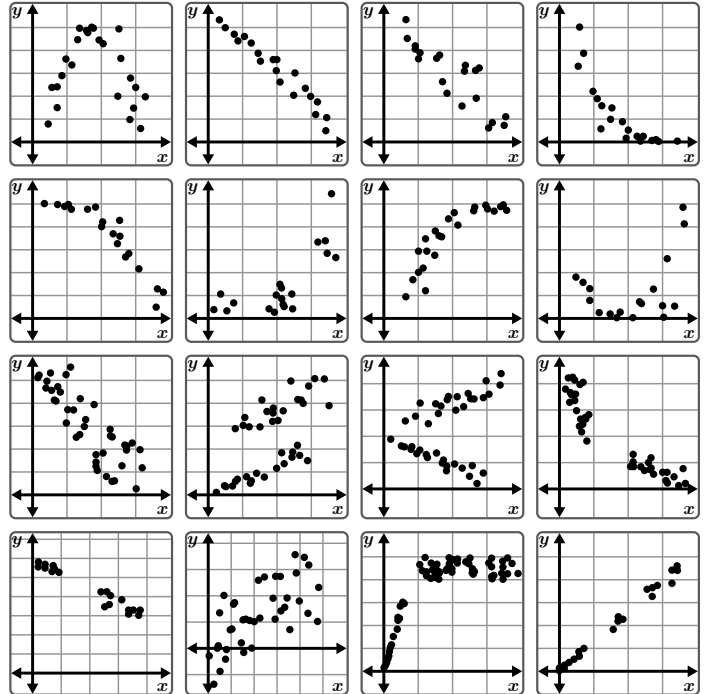
Round 2



Round 3



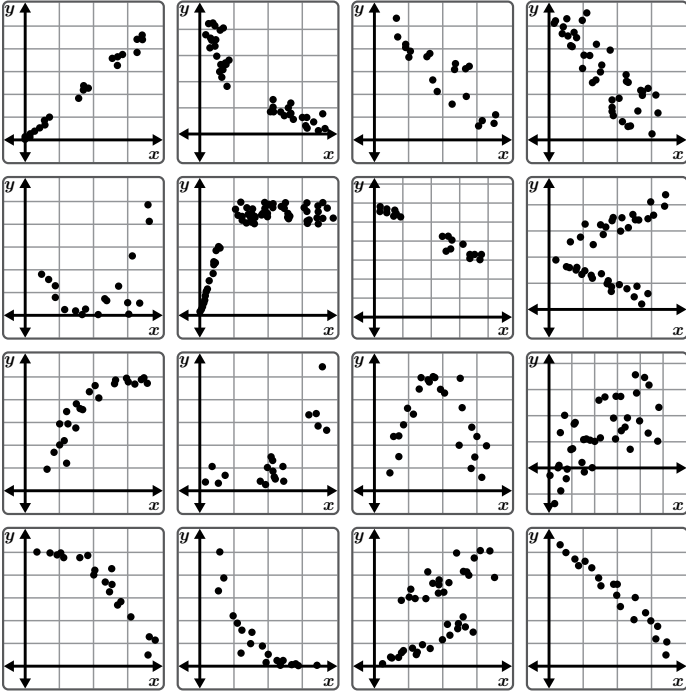
Round 4



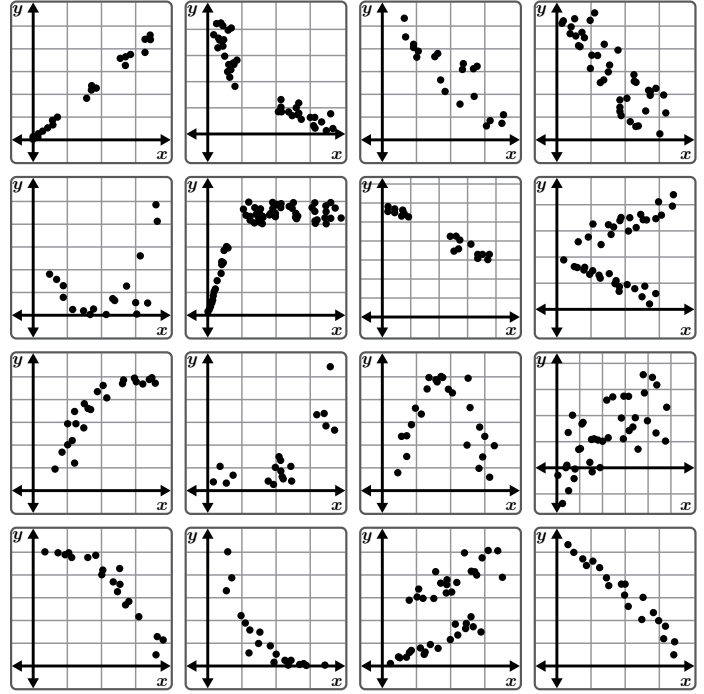
Name: Date: Period:

Polygraph Set B

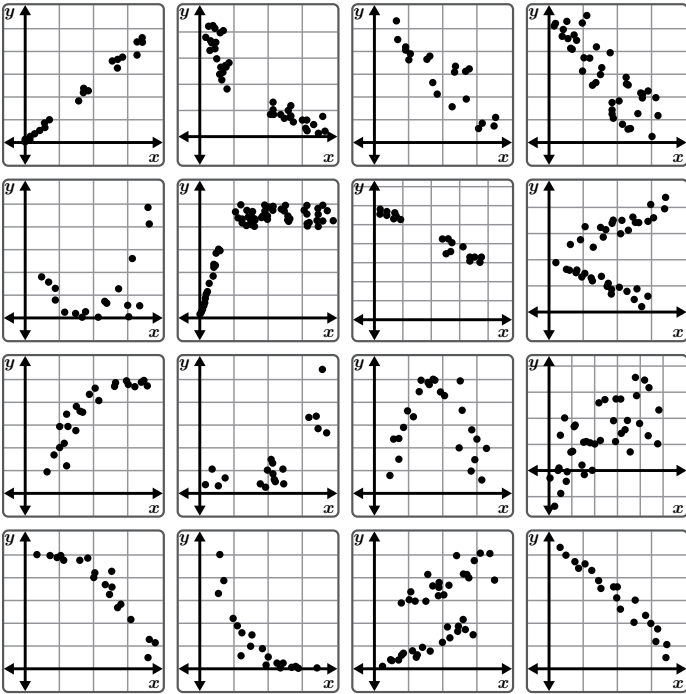
Round 1



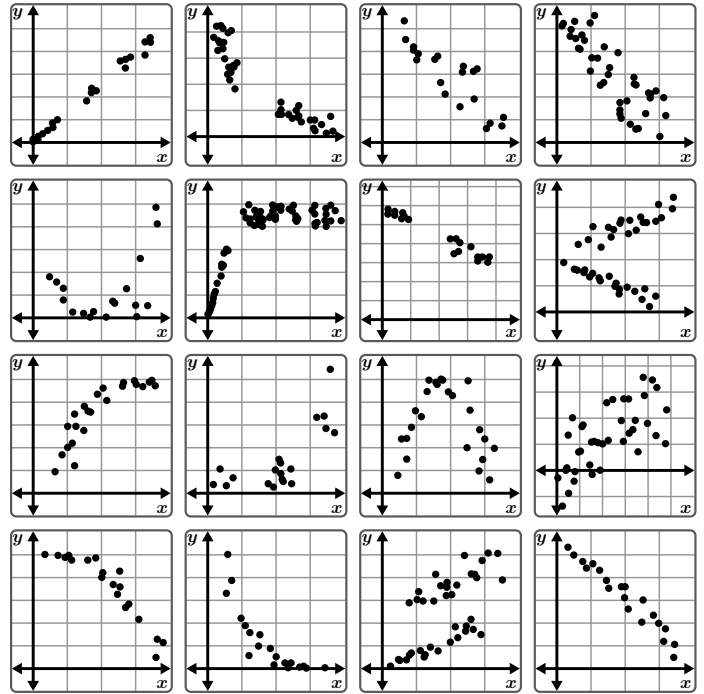
Round 2



Round 3



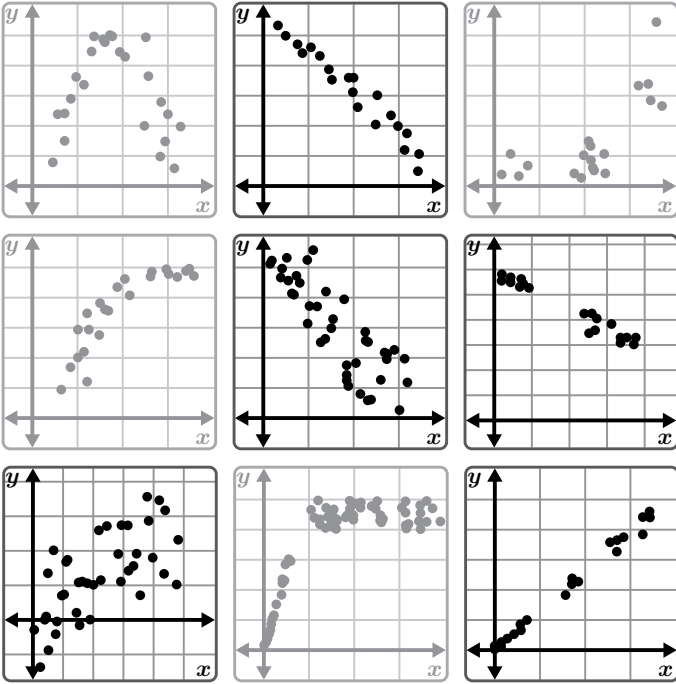
Round 4



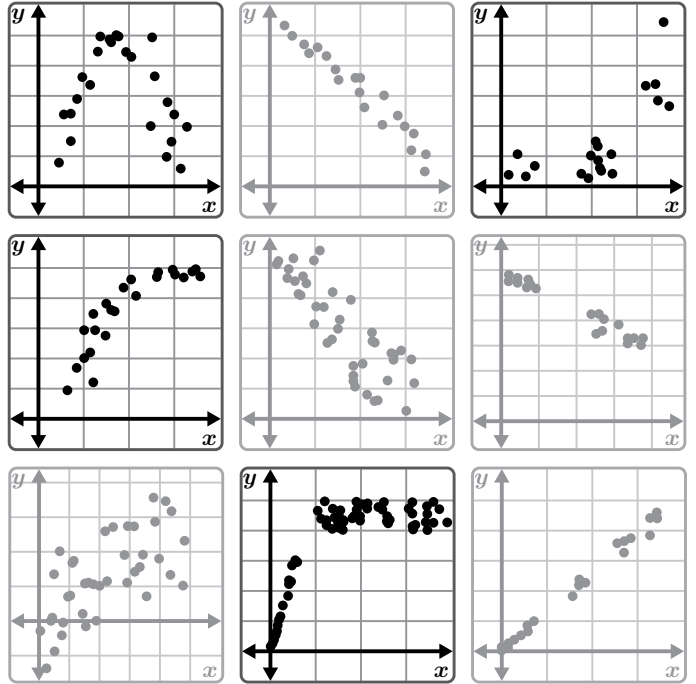
Name: Date: Period:

Scatter Plot City

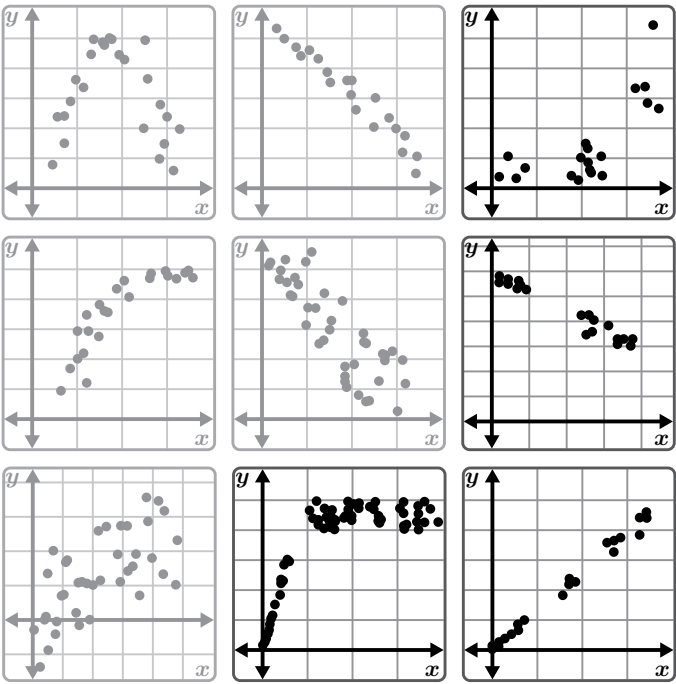
Linear Association



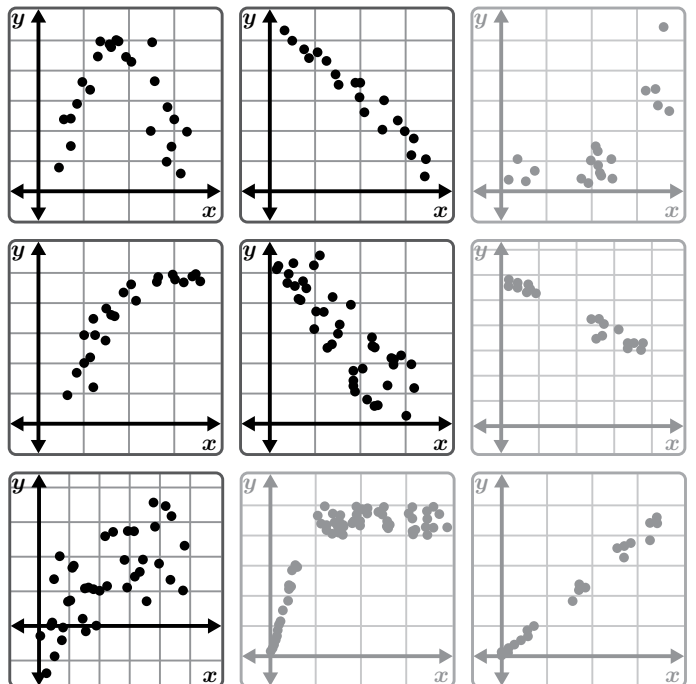
Non-Linear Association



With Clusters




Without Clusters



Unit 7

**Activity Sheets
and Cards**

Rules for Exponents

 Directions: Make two copies per group. Then pre-cut the cards and give each group two sets.

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM) and Open Up Resources.

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 8

**Activity Sheets
and Cards**

Name: Date: Period:

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	$\sqrt{225} = 15$

Name: Date: Period:

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	$\sqrt[3]{125} = 5$

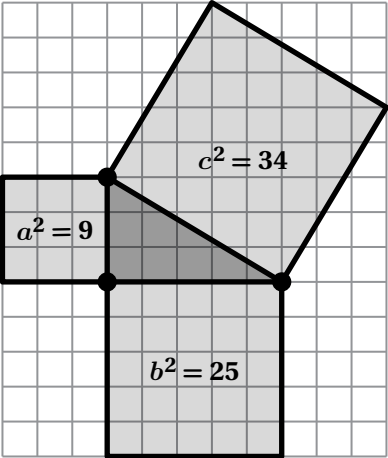
$(-1)^3$	-1	$\sqrt[3]{-1} = -1$
$(-2)^3$	-8	$\sqrt[3]{-8} = -2$
$(-3)^3$	-27	$\sqrt[3]{-27} = -3$
$(-4)^3$	-64	$\sqrt[3]{-64} = -4$
$(-5)^3$	-125	$\sqrt[3]{-125} = -5$

True for Every Triangle?

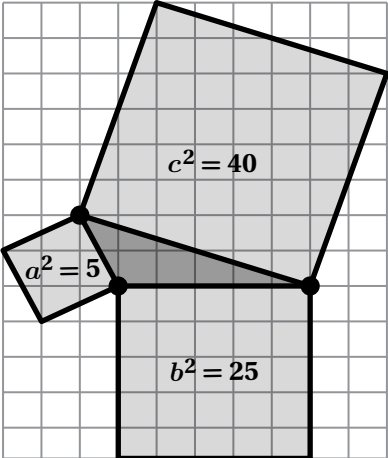
✂ Directions: Make one copy per pair. Pre-cut the cards and distribute them so that each pair receives one set.

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM) and Open Up Resources.

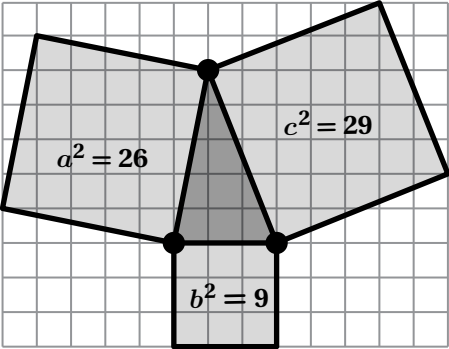
Card 1



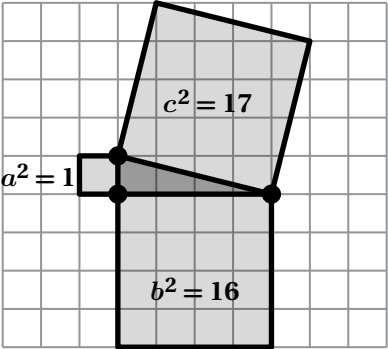
Card 2



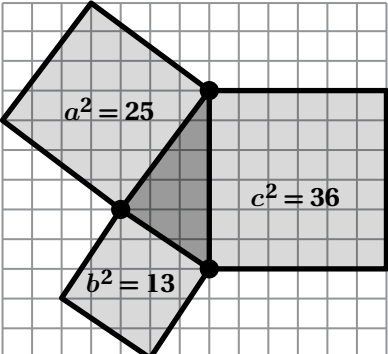
Card 3



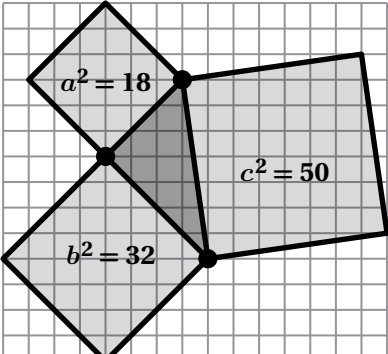
Card 4



Card 5



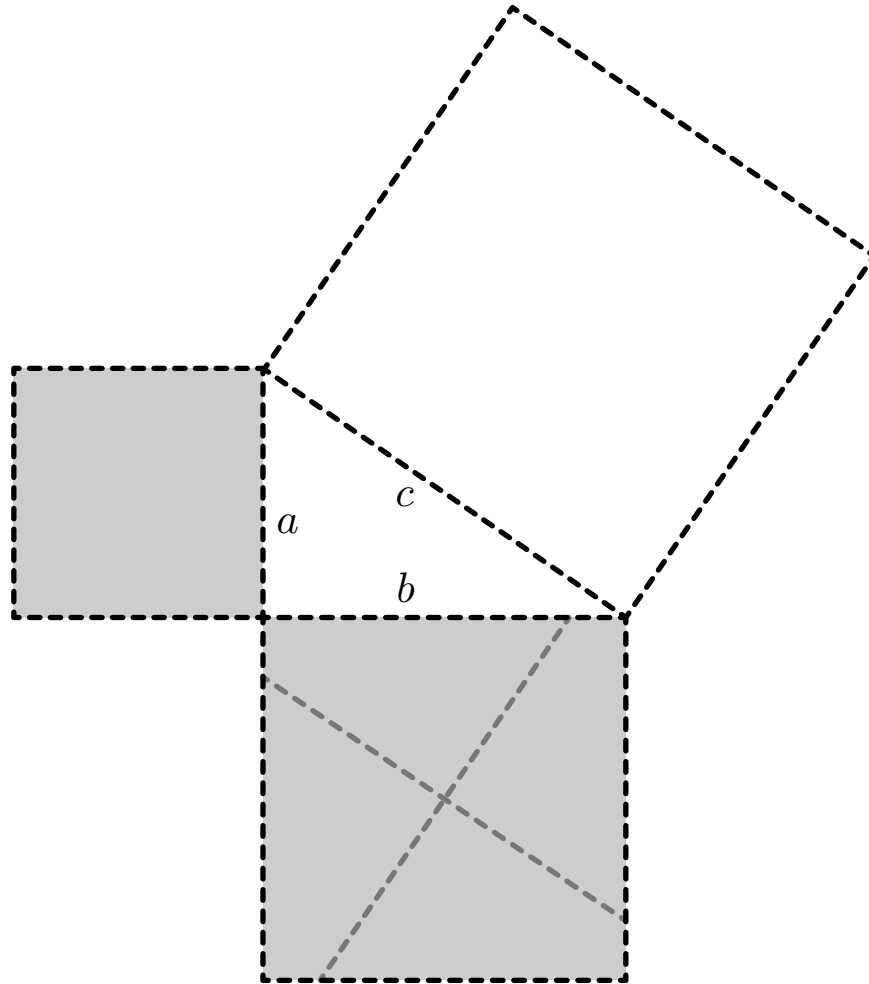
Card 6



Name: Date: Period:

Explore More

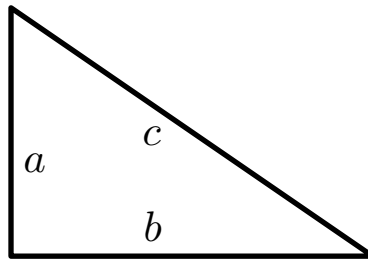
- Use scissors to cut along the dashed lines. Arrange the pieces in the smaller squares to fit in the large square.
- Describe what you notice about the relationship between the areas of the two smaller squares and the area of the large square.



Name: Date: Period:


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.

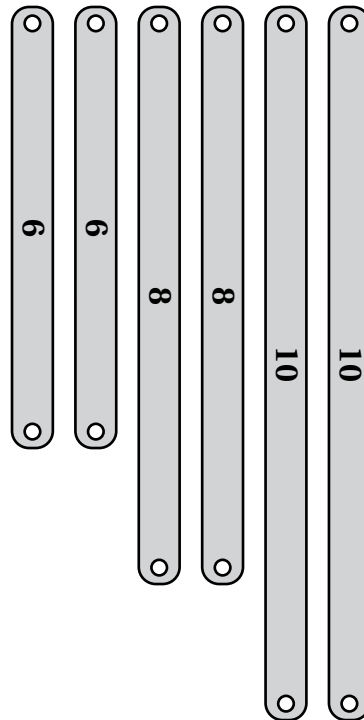
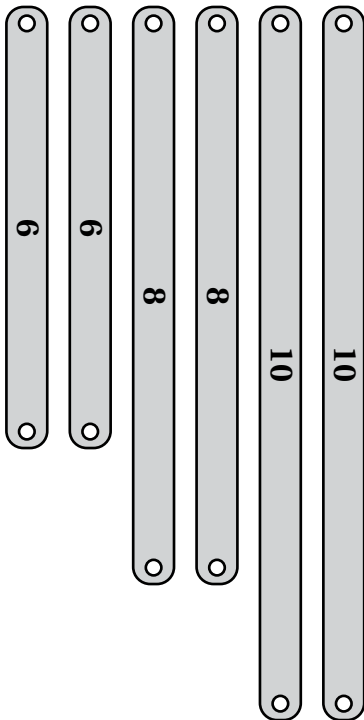
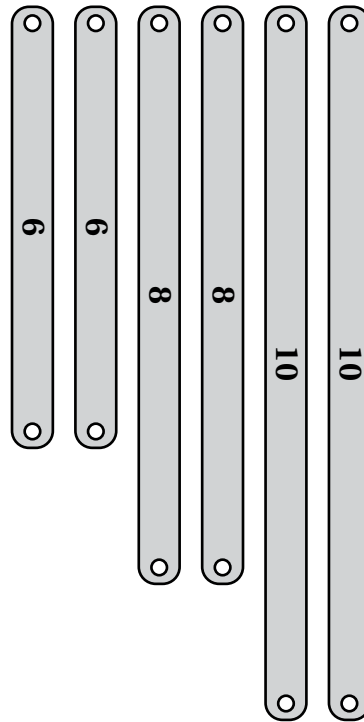
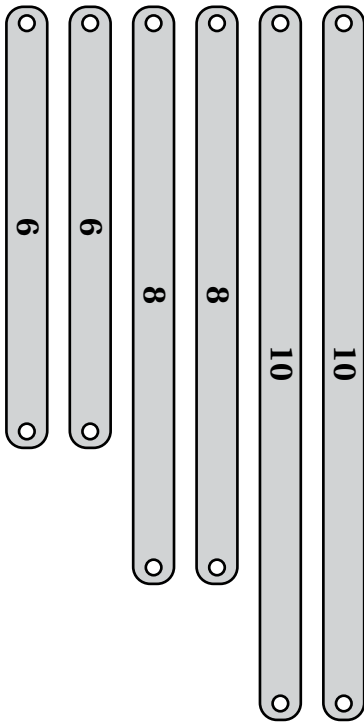


- b Describe what you notice about the relationship between the areas of the two smaller squares and the area of the large square.


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.

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM) and Open Up Resources.



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.

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM) and Open Up Resources.


14
13
12
11
10
9
8

2
3
3
4
5
5
6
7

14
13
12
11
10
9
8

2
3
3
4
5
5
6
7

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.

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM) and Open Up Resources.

.....'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

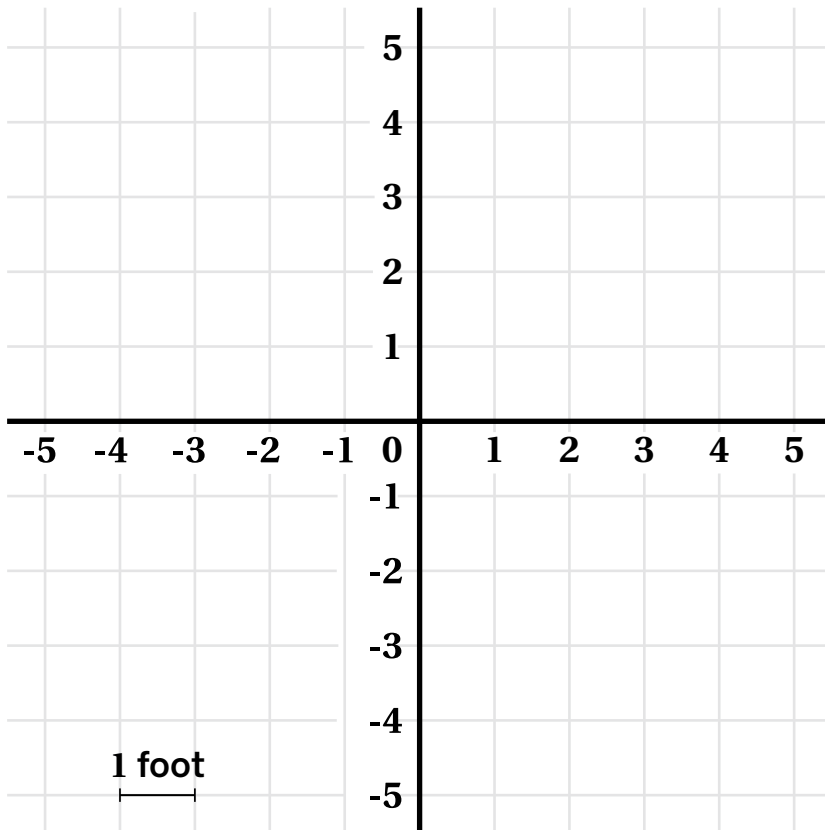
Select the correct length of the third segment.

- A. units
- B. units
- C. units

Name: Date: Period:

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.



Amplify. For more information visit amplify.com

ISBN 978895804759



9 798895 804759