



Assessment and Lesson Resources



Inside you'll find:

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

Amplify Desmos Math **FLORIDA**

Grade 7

Assessment and Lesson
Resources

About Amplify

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

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

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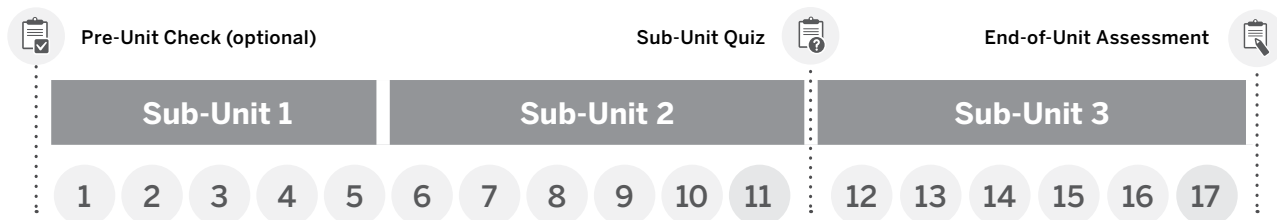
Assessment Overview

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

Course

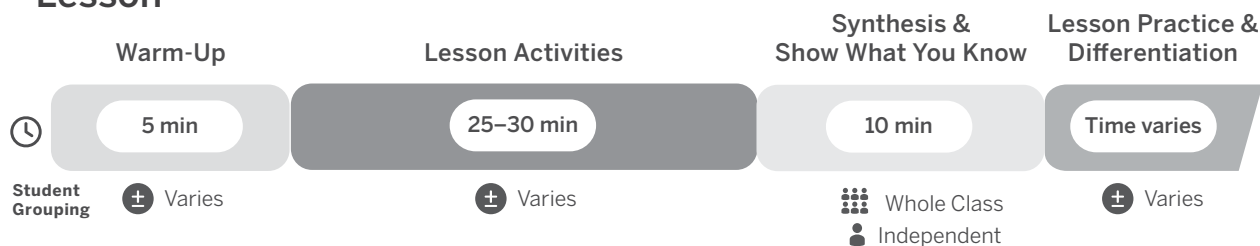


Unit



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.

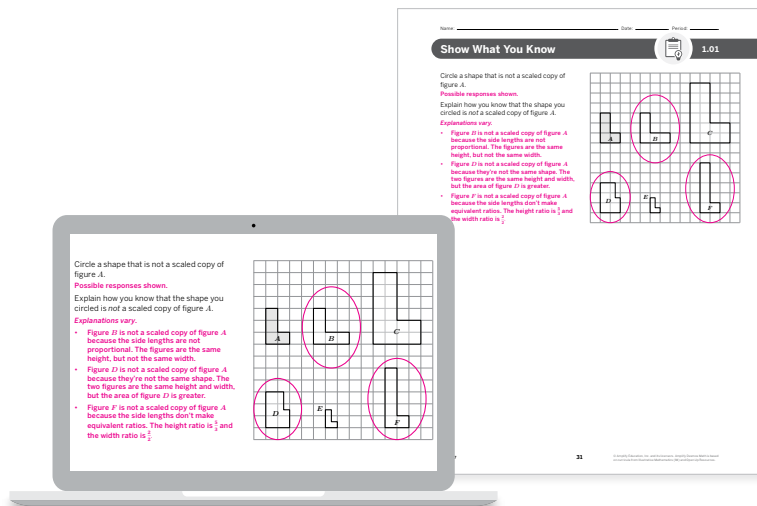
End-of-Lesson Assessment

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.



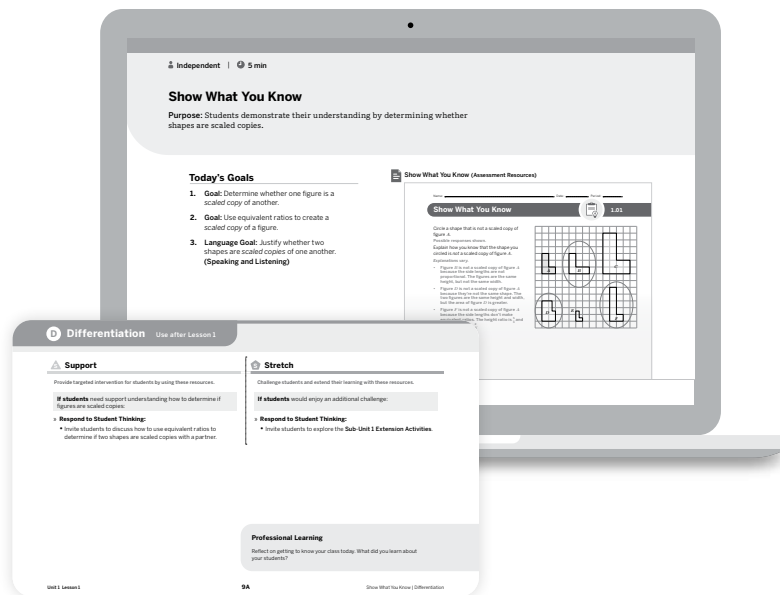
Differentiation Beyond the Lesson

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.



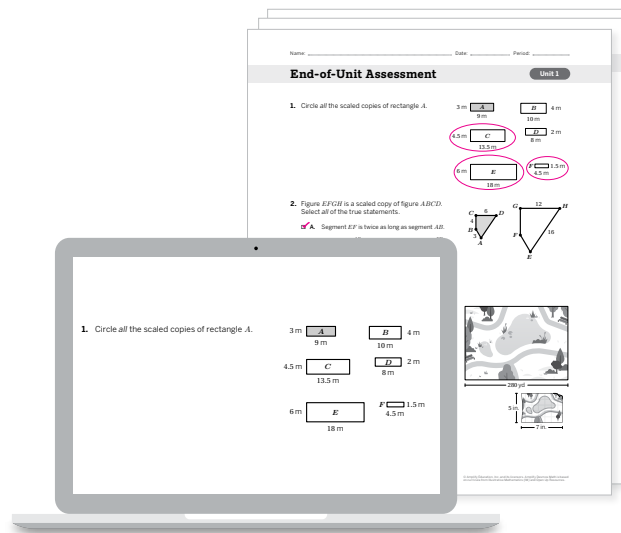
Sub-Unit Quizzes

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	Identify scaled copies by comparing corresponding side lengths	Lesson 2	1	MA.7.GR.1.5
2	Understanding how scale factors affect the distances in and areas of scaled copies	Lessons 4 and 5	2	MA.7.GR.1.5
3	Calculating the areas of scaled drawings when given two images	Lesson 5	2	MA.7.GR.1.5
4	Drawing scaled copies of figures on a grid using the structure of the grid to ensure accuracy	Lesson 3	2	MA.7.GR.1.5 MTR.5.1
5a, 5b	Using scales and scale drawings to calculate actual and scaled distances on a map	Lesson 7	1	MA.7.GR.1.5 MTR.6.1
6a, 6b	Calculating precise distances on a scale drawing when given a drawing with a different scale	Lessons 9 and 10	2	MA.7.GR.1.5 MTR.3.1

D Differentiation

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

Differentiation (End-of-Unit Assessment)		
Sub-Unit Goals	Problem(s)	To respond to student thinking, consider:
Sub-Unit 1 • Describe how scaling affects lengths, angles, and areas in scaled copies. • Use scale factors to create and compare scaled copies. (Lessons 1-5)	2, 3	Support <ul style="list-style-type: none"> Teacher Move: Consider re-explaining... <ul style="list-style-type: none"> Unit 1, Lesson 4 (Scale Factor Challenge) Unit 1, Lesson 5 (Area) Teacher Move: Consider asking, "How can you calculate the scale factor in this situation?"
		Strengthen <ul style="list-style-type: none"> Repeated Challenges: Lesson 3 (Drawing Scaled Copies With a Grid)
	1, 4	Support <ul style="list-style-type: none"> Mini-Lesson: Connecting Scale Factors to Scaled Copies (M.1.04) Teacher Move: Consider re-explaining... <ul style="list-style-type: none"> Unit 1, Lesson 2 (Scaling Objects) Unit 1, Lesson 3 (Make It Smaller) Teacher Move: Consider asking, "Where can you find equivalent ratios in scaled copies?"
		Strengthen <ul style="list-style-type: none"> Repeated Challenges: Lesson 4 (Scale Factor Challenge)
Sub-Unit 2 • Represent distances in the real world using scale and scale drawings. (Lessons 6-10)	5	Support <ul style="list-style-type: none"> Teacher Move: Consider re-explaining Unit 1, Lesson 7 (Wall Paper) Teacher Move: Consider asking students to explain in words what the map scale is telling them.
		Strengthen <ul style="list-style-type: none"> Repeated Challenges: Lesson 8 (Scaling States, Part 1)
	6	Stretch <ul style="list-style-type: none"> You're invited to explore more: <ul style="list-style-type: none"> Lesson 6 (Scale Factor Challenge) Lesson 3 (Make It Smaller)
		Support <ul style="list-style-type: none"> Teacher Move: Consider re-explaining... <ul style="list-style-type: none"> Unit 1, Lesson 9 (Scaling States, Part 2) Unit 1, Lesson 10 (Scaling Buildings)
Strengthen <ul style="list-style-type: none"> Inviting students to create their own scaled drawing 		
Stretch <ul style="list-style-type: none"> You're invited to explore more: <ul style="list-style-type: none"> Lesson 7 (Wall Paper) 		

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.

The image displays a digital assessment interface. On the left, a laptop screen shows a math problem: "1. Circle all the scaled copies of rectangle A." Below the problem are several rectangles labeled A through F with their dimensions. A circular callout provides a detailed view of the rubric for this problem, showing a 4-point scale with descriptions for each level: Meeting (All correct choices and no incorrect choices), Approaching (One or two correct choices and no incorrect choices), Developing (One or two correct choices and one incorrect choice), and Beginning (Only incorrect choices). On the right, a separate document titled "Rubric | End-of-Unit Assessment Form A" shows a similar rubric for "Problem 1" and "Problem 2", with columns for Meeting, Approaching, Developing, and Beginning, and rows for different performance levels. The rubric for Problem 1 includes specific feedback for each level, such as "See an area measured choice with some correct choices" for the Beginning level.

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

Lesson Resources

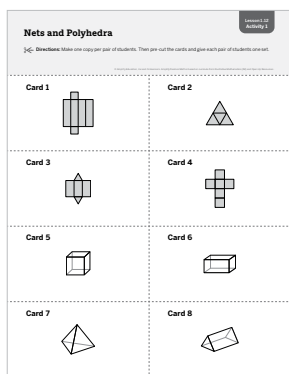
Some Amplify Desmos Math Florida lessons include Lesson Resources in addition to the Teacher and Student edition pages that help make learning more hands-on and collaborative.

Types of Lesson Resources

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

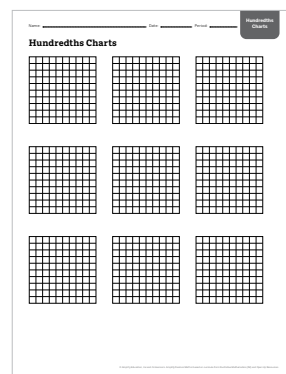
Activity Sheets and Cards

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



Optional Sheets

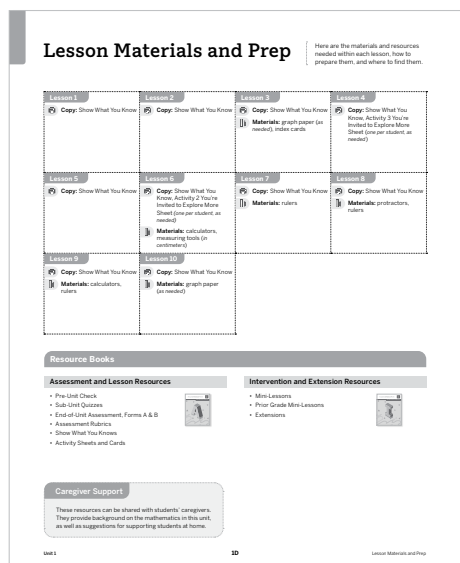
Some lessons contain optional sheets that can be used as needed, such as number lines or hundredths charts.



Preparing Lesson Resources

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

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



Assessment Resources

Unit 1

Assessments and Rubrics

Pre-Unit Check

Unit 1

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

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

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

a $4 \cdot \dots = 24$

b $24 \cdot \dots = 4$

c $3 \cdot \dots = 12$

d $12 \cdot \dots = 3$

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

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

Order the names based on how much water was drunk.

Explain your thinking.

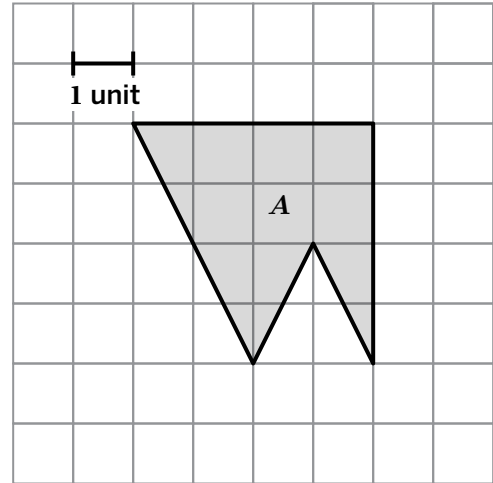
	Name
Least	
Greatest	

Pre-Unit Check (continued)

Unit 1

4. What is the area of figure *A*?

Explain or show your thinking.



5. Order these units by length.

1 mile 1 inch 1 yard 1 foot

--	--	--	--

Least

Greatest

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

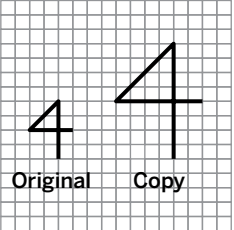
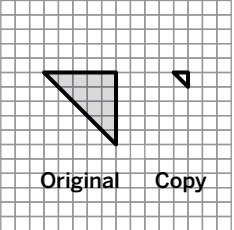
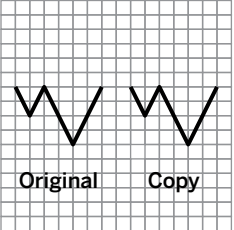
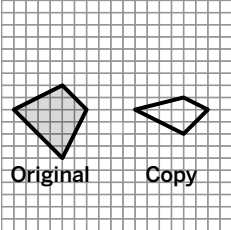
Complete the table of Wiffles and inches.

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

Sub-Unit Quiz

Unit 1

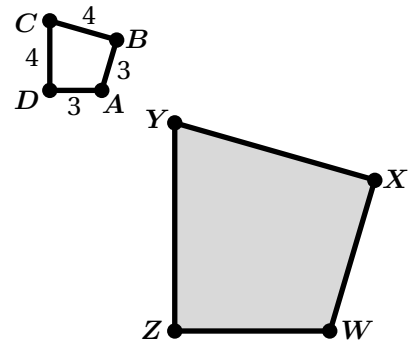
1. Here are pairs of figures, each with an original and a copy. Which pair shows a *scaled* copy that has a scale factor of less than 1?

A.  B.  C.  D. 

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

Select *all* the true statements.

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

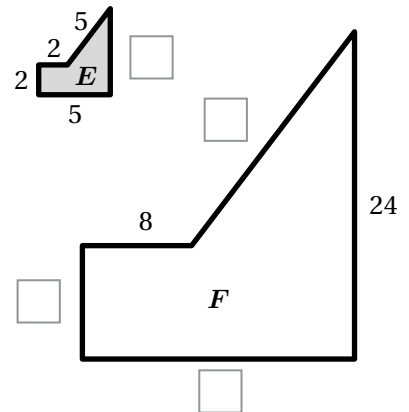


All lengths are in grid units.

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

- a Label each missing length.
- b What scale factor takes figure E to figure F ?
- c What scale factor takes figure F back to figure E ?

Explain how you know.



All lengths are in grid units.

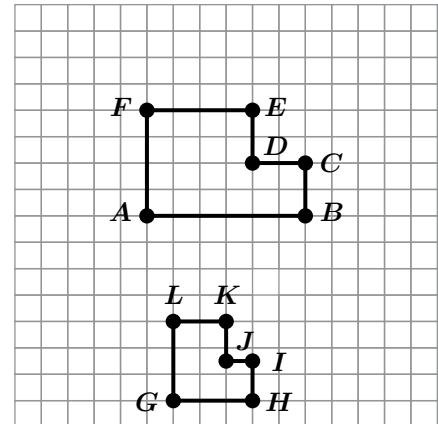
Sub-Unit Quiz (continued)

Unit 1

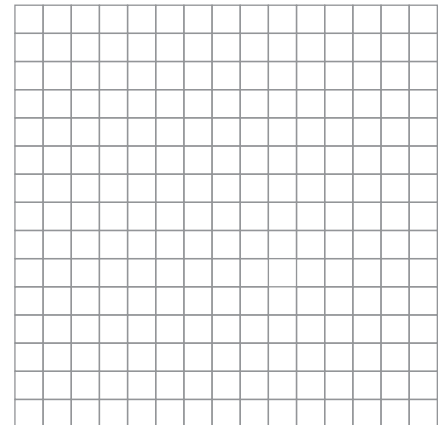
4. Here are figures *ABCDEF* and *GHIJKL*.

- a Are the side lengths in *ABCDEF* proportional to the side lengths in *GHIJKL*?

Explain how you know.



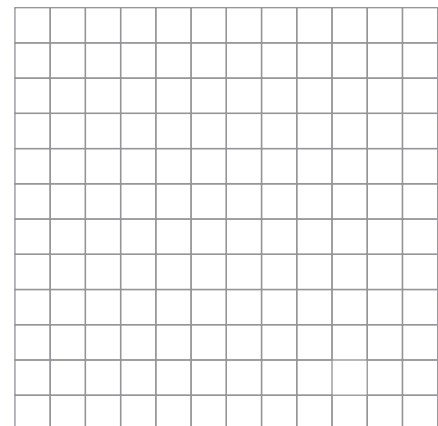
- b Draw a scaled copy of figure *ABCDEF* using a scale factor of $\frac{3}{2}$.



5. Rectangle *S* is 3 units by 5 units.

- a Draw a scaled copy of rectangle *S* with an area of 60 square units. Label each side length of the copy.
- b What is the scale factor between rectangle *S* and your copy?

Explain how you know.



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

Problem 1		Standards: MA.7.GR.1.5, MTR.5.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice:</p> 			<p>Incorrect choice.</p> <p>Students who select the pair of identical images may have answered the question "Which scaled copy has a scale factor equal to 1?"</p>

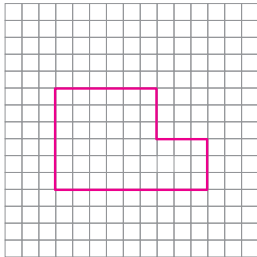
Problem 2		Standard: MA.7.GR.1.5	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>All correct choices and no incorrect choices.</p> <ul style="list-style-type: none"> The scale factor from $WXYZ$ to $ABCD$ is $\frac{1}{3}$. The distance between W and Y is 3 times the distance between A and C. The ratio of $\frac{BC}{BA}$ is equivalent to the ratio of $\frac{XY}{XW}$. 	<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>

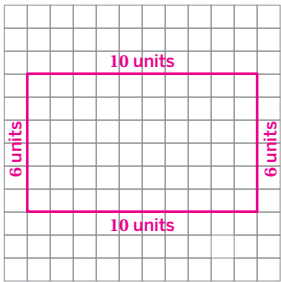
Problem 3a		Standard: MA.7.GR.1.5	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Three out of four correct lengths.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Two out of four correct lengths.</p>	<p>Response shows limited understanding.</p>

Problem 3b		Standard: MA.7.GR.1.5	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>4</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write $\frac{1}{4}$ (or equivalent) may have answered the question “In order to scale figure <i>F</i> to figure <i>E</i>, what scale factor should you use?”</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write 6 may have subtracted the corresponding side lengths instead of dividing them.</p>	<p>Response shows limited understanding.</p>

Problem 3c		Standards: MA.7.GR.1.5, MTR.3.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p>$\frac{1}{4}$. <i>Explanations vary.</i></p> <ul style="list-style-type: none"> • The scale factor is $\frac{1}{4}$ because if I multiply each side of figure F by $\frac{1}{4}$, I get the side lengths of figure E. • The ratio of any side length in figure E to the same side length in figure F is $\frac{1}{4}$. This is the scale factor I use to scale figure F back to figure E. 	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write 4 may have answered the question “What scale factor takes figure E to figure F?”</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write 6 or -6 may have subtracted the corresponding side lengths instead of dividing them.</p>	<p>Response shows limited understanding.</p>

Problem 4a		Standards: MA.7.GR.1.5, MTR.3.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p><i>No. Explanations vary.</i></p> <ul style="list-style-type: none"> • Even though the width of $EFGH$ is half the width of $ABCD$, its height is not half. So the side lengths of the figures are not proportional. • The side lengths of the figures are not proportional because they don't have equivalent ratios. For example, the widths form a ratio of $\frac{8}{4} = 2$, but the heights form a ratio of $\frac{4}{3}$, which is not equal to 2. 	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write "No, they are different shapes" may recognize that scaled copies have dimensions that have a constant ratio with each other.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write "Yes, they look the same" may recognize that scaled copies have the same shape.</p>	<p>Response shows limited understanding.</p>

Problem 4b		Standard: MA.7.GR.1.5	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> 	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who draw a scaled copy with a scale factor other than $\frac{3}{2}$ may understand the meaning of a scaled copy but made a calculation error.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who draw a similar figure that is not a scaled copy may recognize that scaled copies have the same shape.</p>	<p>Response shows limited understanding.</p>

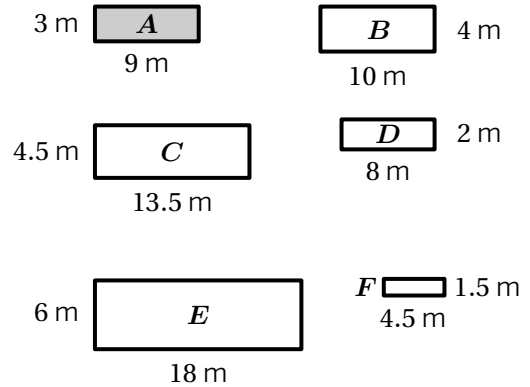
Problem 5a		Standard: MA.7.GR.1.5	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> 	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who draw a rectangle with side lengths 12 units by 20 units may have used a scale factor of 4 because the area of rectangle <i>S</i> multiplied by 4.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who draw a rectangle with side lengths 3 units by 5 units may need support understanding the question.</p>	<p>Response shows limited understanding.</p>

Problem 5b		Standards: MA.7.GR.1.5, MTR.4.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p>2. Explanations vary. Student response depends on their response in Problem 5a.</p> <p>If their response in Problem 5a is correct, here is a sample response: All of the lengths of the scaled copy are twice the lengths of the original figure. For example, the height of the original figure is 3 units, while the height of the scaled copy is $3 \cdot 2 = 6$ units.</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write 4 Units may have noticed the area of rectangle <i>S</i> multiplied by 4.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write a value larger than 1 may recognize that the scale factor needs to be larger than 1 to produce a larger copy.</p>	<p>Response shows limited understanding.</p>

End-of-Unit Assessment

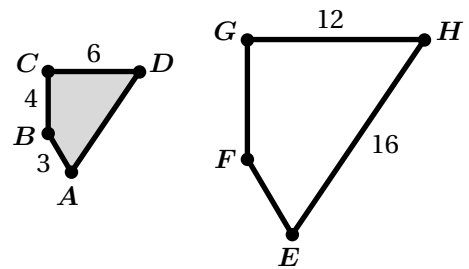
Unit 1

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



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

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

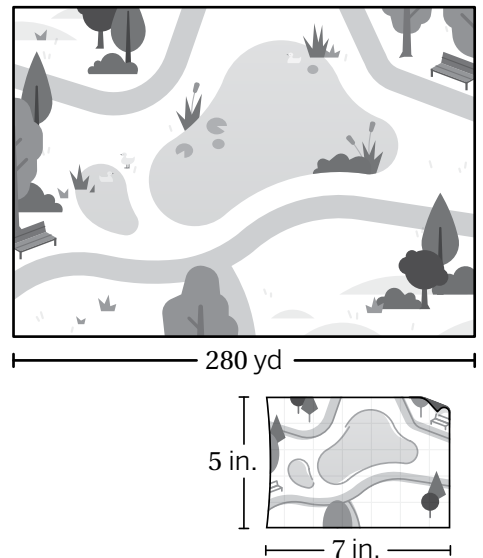


3. A scale drawing of a rectangular park is 5 inches wide and 7 inches long.

The actual park is 280 yards long.

What is its area?

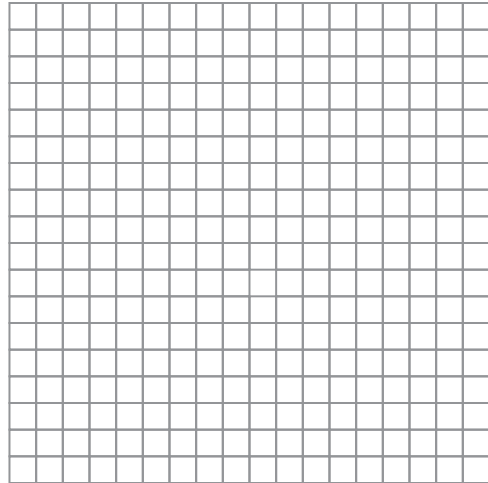
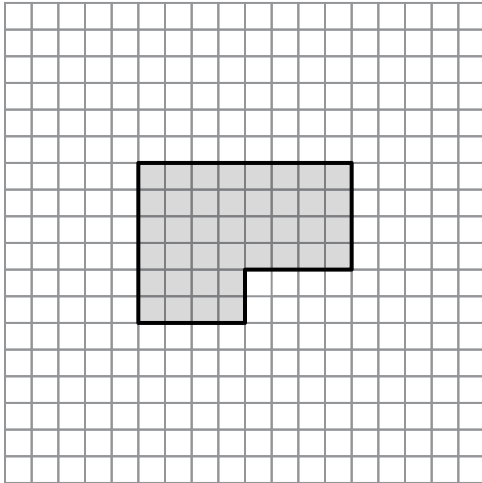
- A. 35 square yards
- B. 200 square yards
- C. 1,400 square yards
- D. 56,000 square yards



End-of-Unit Assessment (continued)

Unit 1

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



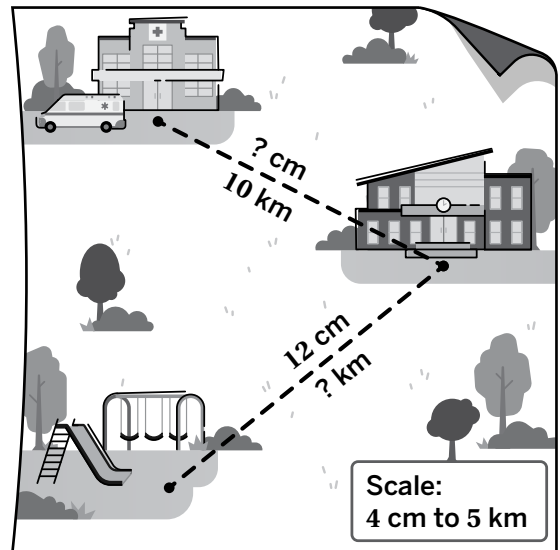
5. Roberto is drawing a map of his town.

- a He wants to include a school and a hospital, which are 10 kilometers apart.

What should the distance between the school and the hospital be on the map?

- b On the map, the school and the playground are 12 centimeters apart.

What is the actual distance between the school and the playground?



End-of-Unit Assessment (continued)

Unit 1

6. A runner gets a new map of her favorite running trail.


- Her old map has a scale of 1 centimeter to 100 meters.
 - Her new map has a scale of 1 centimeter to 500 meters.
- a If the maps represent the same area, are the distances on the new map longer, shorter, or the same size as the old map?
- A. Longer
 - B. Shorter
 - C. The same size


Explain your thinking.


- b Her favorite running trail was 40 centimeters long on her old map.


How long is this trail on her new map?

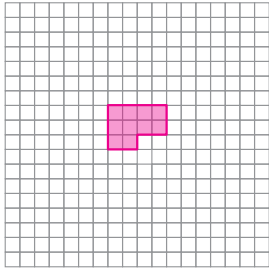
Explain your thinking.

 Standard	MA.7.GR.1.5
Problem(s)	1, 2, 3, 4, 5, 6

Problem 1  Standard: MA.7.GR.1.5			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>All correct choices and no incorrect choices.</p> <ul style="list-style-type: none"> Rectangle <i>C</i> Rectangle <i>E</i> Rectangle <i>F</i> 	<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  Standard: MA.7.GR.1.5			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Both correct choices and no incorrect choices.</p> <ul style="list-style-type: none"> Segment <i>EF</i> is twice as long as segment <i>AB</i>. The length of segment <i>AD</i> is 8 units. 	<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.7.GR.1.5			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice:</p> <p>56,000 square yards</p>			<p>Incorrect choice.</p> <p>Students who select 200 square yards may have found the correct width of the park instead of the area.</p> <p>Students who select 1,400 square yards may have multiplied the area of the drawing by the scale factor, 40.</p> <p>Students who select 35 square yards may have calculated the area of the scale drawing rather than that of the park.</p>

Problem 4 Standards: MA.7.GR.1.5, MTR.5.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: A scaled copy of the polygon with a scale factor of $\frac{1}{2}$.</p> 	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response includes minor errors in determining the dimensions of the figure, such as a pair of segments 1 unit longer than they should be.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who draw a scaled copy that is larger than the original may not recognize that a scale factor between 0 and 1 is a reduction.</p>	<p>Response shows limited understanding.</p> <p>E.g., Response includes adding or subtracting $\frac{1}{2}$ to the length of each side.</p>

Problem 5a Standards: MA.7.GR.1.5, MTR.6.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: 8 centimeters</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write "12.5 centimeters" may have incorrectly interpreted or applied the scale factor instead using a scale of 5 centimeters to 4 kilometers.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write "0.8 centimeters" or "1.25 centimeters" may have correctly determined a unit rate but did not apply it to 10 kilometers.</p>	<p>Response shows limited understanding.</p> <p>E.g., Response includes adding or subtracting 1 to/from the distance.</p>

Problem 5b Standards: MA.7.GR.1.5, MTR.6.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: 15 kilometers</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write "9.6 kilometers" may have incorrectly interpreted or applied the scale factor instead using a scale of 5 centimeters to 4 kilometers.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write "0.8 kilometers" or "1.25 kilometers" may have correctly determined a unit rate but did not apply it to the 12 centimeters.</p>	<p>Response shows limited understanding.</p> <p>E.g., Response includes adding or subtracting 1 to/from the distance.</p>

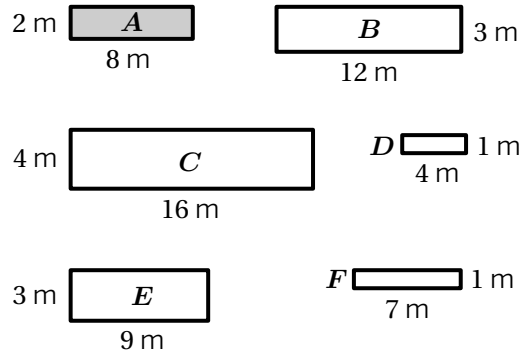
Problem 6a			
Standards: MA.7.GR.1.5, MTR.3.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice and complete explanation.</p> <p>Shorter</p> <p><i>Explanations vary. If each centimeter on the new map represents five times the distance on the old map, the new map is much smaller. Each distance on the new map would be $\frac{1}{5}$ of the distance on the old map.</i></p>	<p>Correct choice with minor flaws in explanation.</p> <p>Incorrect choice with logical and complete explanation.</p> <p>E.g., Response mentions that each centimeter on the new map represents more distance, so the new map is smaller.</p>	<p>Correct choice with incomplete explanation.</p> <p>Incorrect choice with explanation that shows partial understanding.</p> <p>Students who select <i>Longer</i> may think that because $100 \cdot 5 = 500$, lengths on the new map will be 5 times longer.</p>	<p>Incorrect choice with incorrect explanation or no explanation.</p>

Problem 6b			
Standards: MA.7.GR.1.5, MTR.3.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p>8 centimeters.</p> <p><i>Explanations vary. Using the scales of both maps, a trail that is 40 centimeters long on her old map would be equivalent to an actual distance of 4,000 meters or 4 kilometers, since $40 \cdot 100 = 4000$. On her new map, this same distance would be 8 centimeters because $\frac{4000}{500} = 8$.</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 arithmetic errors in otherwise correct work.</p> <p>E.g., Response includes correctly finding the actual distance of 4,000 meters.</p> <p>E.g., Response includes inverting a scale factor (or multiplying when division is called for).</p>	<p>Correct response with incomplete explanation.</p> <p>E.g., Response identifies the new distance as 8 centimeters without discussing scale, scale factor, or actual distance.</p> <p>Incorrect response with explanation that shows partial understanding.</p> <p>E.g., Response includes multiple mistakes that involve inversion of scale factors.</p>	<p>Incorrect response with no explanation.</p>

End-of-Unit Assessment

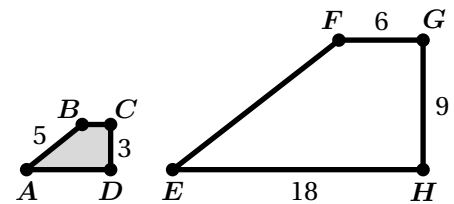
Unit 1

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



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

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

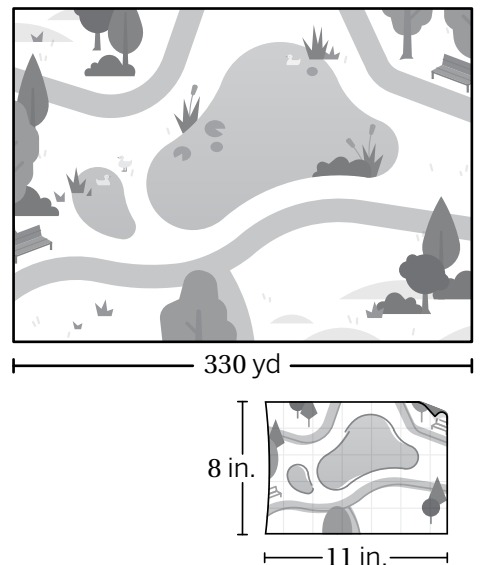


3. A scale drawing of a rectangular park is 8 inches wide and 11 inches long.

The actual park is 330 yards long.

What is its area?

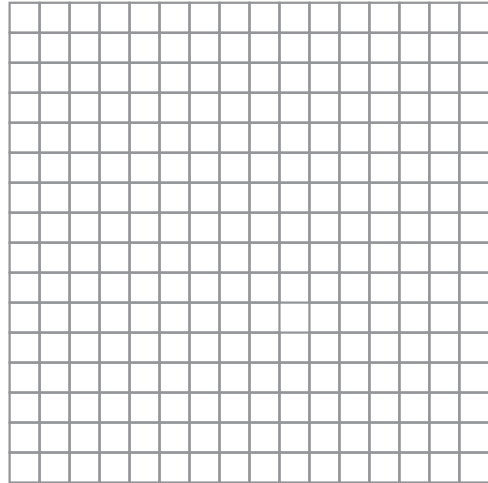
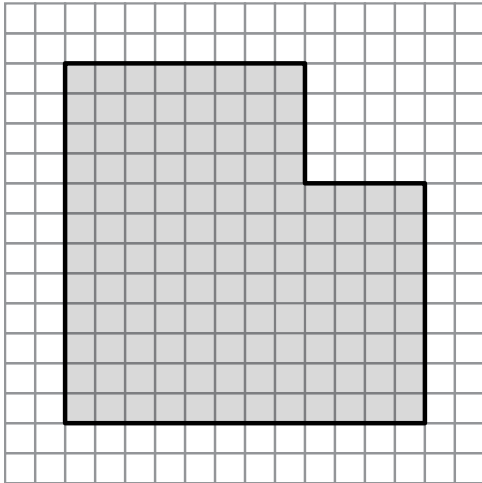
- A. 88 square yards
- B. 240 square yards
- C. 2,640 square yards
- D. 79,200 square yards



End-of-Unit Assessment (continued)

Unit 1

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



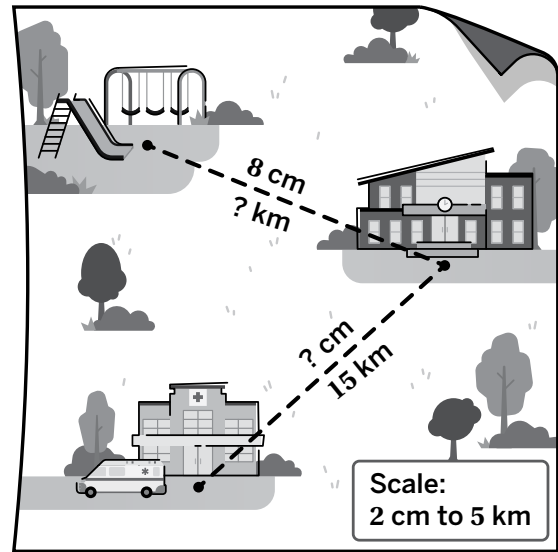
5. Anya is drawing a map of her town.

- a She wants to include a school and a hospital, which are 15 kilometers apart.

What should the distance between the school and the hospital be on the map?

- b On the map, the school and the playground are 8 centimeters apart.

What is the actual distance between the school and the playground?



End-of-Unit Assessment (continued)

Unit 1

6. A runner gets a new map of her favorite running trail.

- Her old map has a scale of 1 centimeter to 400 meters.
- Her new map has a scale of 1 centimeter to 100 meters.

a If the maps represent the same area, will the new map be larger, smaller, or the same size as the old map?

- A.** Larger
- B.** Smaller
- C.** The same size


Explain your thinking.


b Her favorite running trail was 20 centimeters long on her old map.

How long is this trail on her new map?

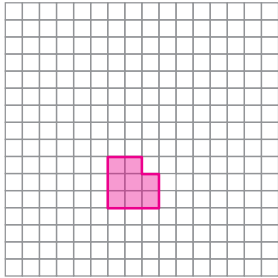
Explain your thinking.

 Standard	MA.7.GR.1.5
Problem(s)	1, 2, 3, 4, 5, 6

Problem 1				 Standard: MA.7.GR.1.5
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>All correct choices and no incorrect choices.</p> <ul style="list-style-type: none"> Rectangle <i>B</i> Rectangle <i>C</i> Rectangle <i>D</i> 	<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				 Standard: MA.7.GR.1.5
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>All correct choices and no incorrect choices.</p> <ul style="list-style-type: none"> The ratio of $\frac{AB}{BC}$ is equivalent to the ratio of $\frac{EF}{FG}$. The scale factor from <i>EFGH</i> to <i>ABCD</i> is $\frac{1}{3}$. The length of segment <i>BC</i> is 2 units. 	<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.7.GR.1.5
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice: 79,200 square yards</p>			<p>Incorrect choice.</p> <p>Students who select 240 square yards may have found the correct width of the park instead of the area.</p> <p>Students who select 2,640 square yards may have multiplied the area of the drawing by the scale factor, 30.</p> <p>Students who select 88 square yards may have calculated the area of the scale drawing rather than that of the park.</p>

Problem 4			Standards: MA.7.GR.1.5, MTR.5.1
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: A scaled copy of the polygon with a scale factor of $\frac{1}{4}$.</p> 	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response includes minor errors in determining the dimensions of the figure, such as a pair of segments 1 unit longer than they should be.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who draw a scaled copy that is larger than the original may not recognize that a scale factor between 0 and 1 is a reduction.</p>	<p>Response shows limited understanding.</p> <p>E.g., Response includes adding or subtracting $\frac{1}{4}$ to the length of each side.</p>

Problem 5a		Standards: MA.7.GR.1.5, MTR.6.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: 6 centimeters</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write "37.5 centimeters" may have incorrectly interpreted or applied the scale factor instead using a scale of 5 centimeters to 2 kilometers.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write "0.4 centimeters" or "2.5 centimeters" may have correctly determined a unit rate but did not apply it to 15 kilometers.</p>	<p>Response shows limited understanding.</p> <p>E.g., Response includes adding or subtracting 3 to/from the distance.</p>

Problem 5b		Standards: MA.7.GR.1.5, MTR.6.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: 20 kilometers</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write "3.2 kilometers" may have incorrectly interpreted or applied the scale factor instead using a scale of 5 centimeters to 2 kilometers.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write "0.4 kilometers" or "2.5 kilometers" may have correctly determined a unit rate but did not apply it to the 8-centimeter distance.</p>	<p>Response shows limited understanding.</p> <p>E.g., Response includes adding or subtracting 3 to/from the distance.</p>

Problem 6a		Standards: MA.7.GR.1.5, MTR.3.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice and complete explanation.</p> <p>Larger Explanations vary. Each centimeter on the old map represents four times the distance on the new map. This means the new map will need more space to represent the same distance.</p>	<p>Correct choice with minor flaws in explanation.</p> <p>Incorrect choice with logical and complete explanation.</p> <p>E.g., Response mentions that each centimeter on the new map represents less distance, so the new map is larger.</p>	<p>Correct choice with incomplete explanation.</p> <p>Incorrect choice with explanation that shows partial understanding.</p> <p>Students who select <i>Smaller</i> may think that because $400 \cdot \frac{1}{4} = 100$, the new map will be $\frac{1}{4}$ the size of the old map.</p>	<p>Incorrect choice with incorrect explanation or no explanation.</p>

Problem 6b		Standards: MA.7.GR.1.5, MTR.3.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p>80 centimeters. <i>Explanations vary.</i> Using the scales of both maps, a trail that is 20 centimeters long on her old map would be equivalent to an actual distance of 8,000 meters or 8 kilometers, since $20 \cdot 400 = 8000$. On her new map, this same distance would be 80 centimeters because $\frac{8000}{100} = 80$.</p>	<p>Correct response with minor flaws in explanation.</p> <p>Incorrect response with logical and complete explanation.</p> <p>E.g., Response includes arithmetic errors in otherwise correct work.</p> <p>E.g., Response includes correctly finding the actual distance of 8,000 meters.</p> <p>E.g., Response includes inverting a scale factor (or multiplying when division is called for).</p>	<p>Correct response with incomplete explanation.</p> <p>E.g., Response identifies the new distance as 80 centimeters without discussing scale, scale factor, or actual distance.</p> <p>Incorrect response with explanation that shows partial understanding.</p> <p>E.g., Response includes multiple mistakes that involve inversion of scale factors.</p>	<p>Incorrect response with no explanation.</p>

Unit 1

**Show What You
Know PDFs**

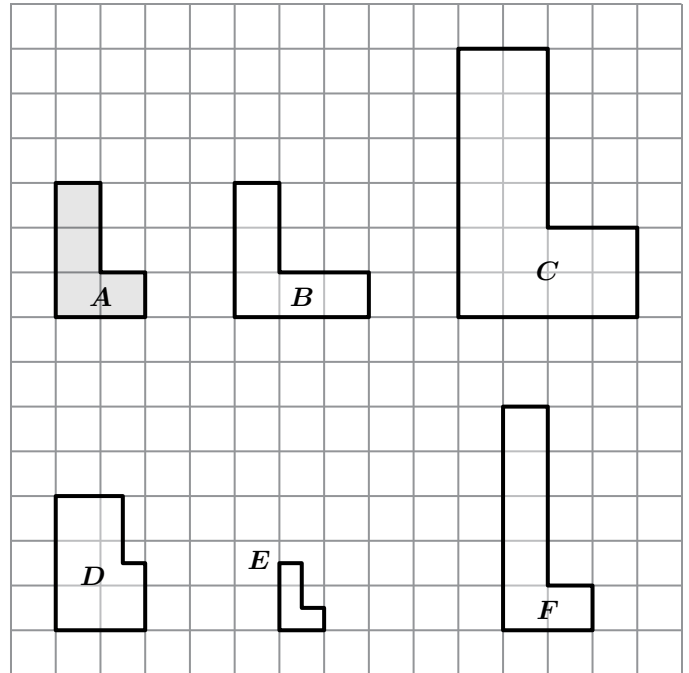
Show What You Know



1.01

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

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



Show What You Know

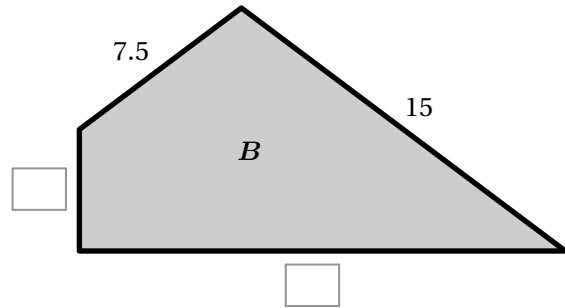
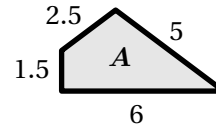


1.02

Figure *B* is a scaled copy of figure *A*.

Determine and label the missing side lengths of figure *B*.

Explain your thinking.

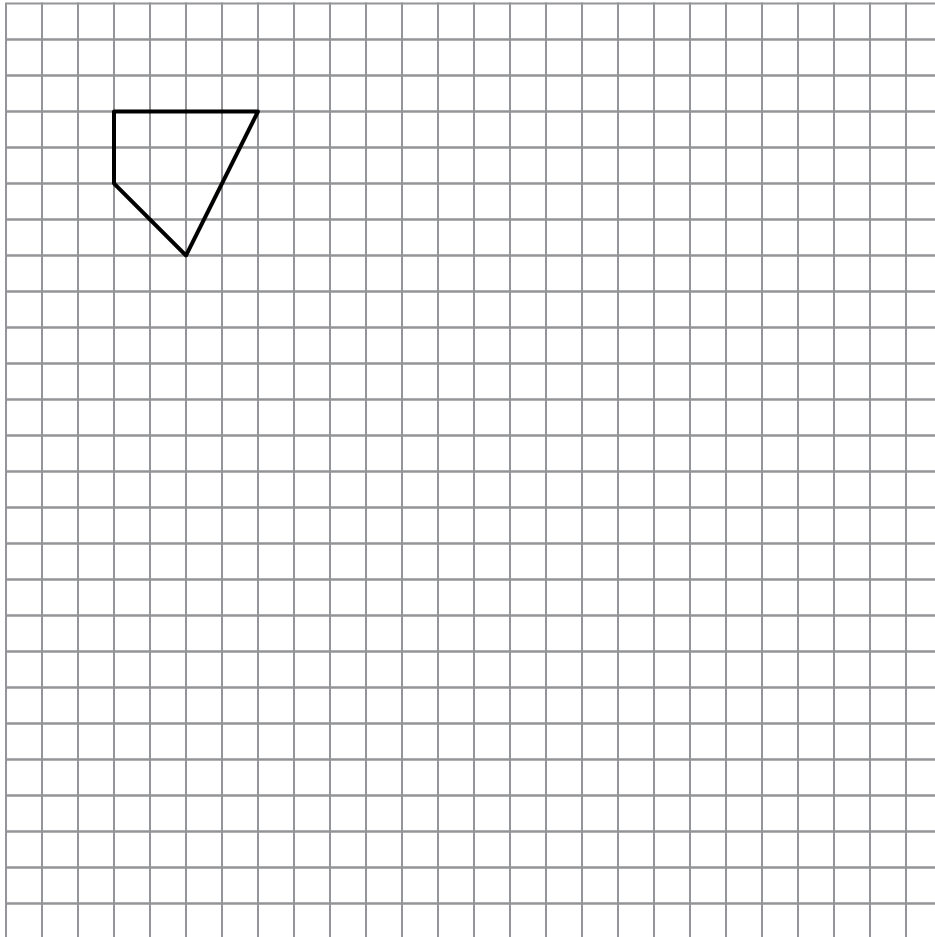


Show What You Know



1.03

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



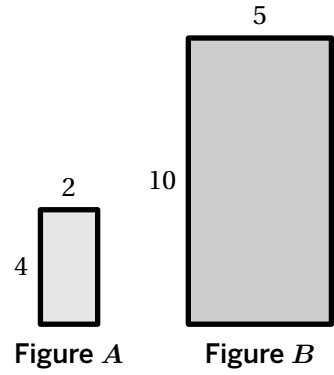
Show What You Know



1.04

What scale factor makes figure *A* match figure *B*?

What scale factor makes figure *B* match figure *A*?



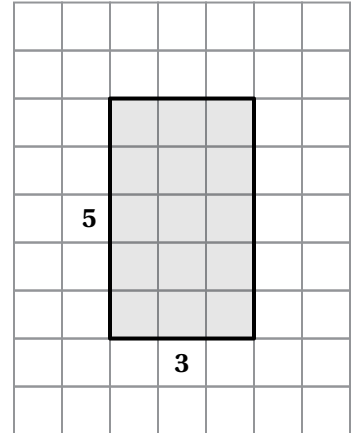
Show What You Know



1.05

Imagine scaling this rectangle using a scale factor of 4.

What is the area of the scaled copy?



Show What You Know

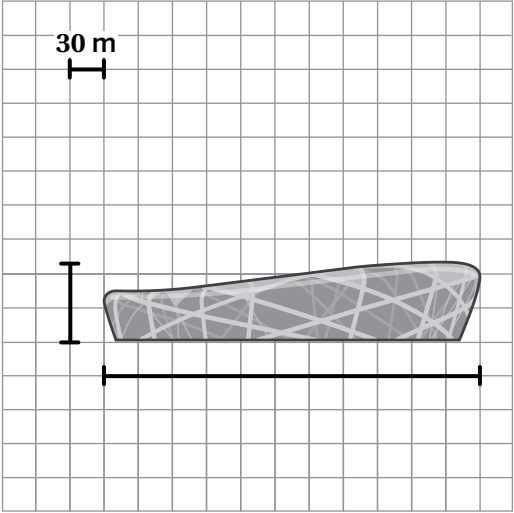


1.06

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

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

Estimated Width (m)	Estimated Height (m)



Show What You Know



1.07

A scale drawing of a school bus has a scale of $\frac{1}{2}$ inch to 5 feet. If the length of the school bus is 4 inches on the scale drawing, what is the actual length of the bus?

Show or explain your thinking.

Show What You Know



1.08

A park has a rectangular swimming pool that is 50 meters long and 25 meters wide. Use a ruler to make a scale drawing of the swimming pool where 1 centimeter represents 10 meters. Label the side lengths of your scale drawing.

Show What You Know



1.09

Aaliyah is making a scale drawing of a rectangular swimming pool. The pool is 50 meters long and 25 meters wide. She originally used a scale of 1 centimeter to 10 meters for her drawing of the pool.

- a Aaliyah needs her drawing to be larger. Suggest a new scale for Aaliyah.

- b Determine the side lengths of the scale drawing using the new scale.

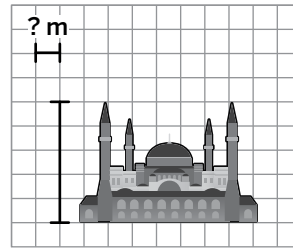
Show What You Know



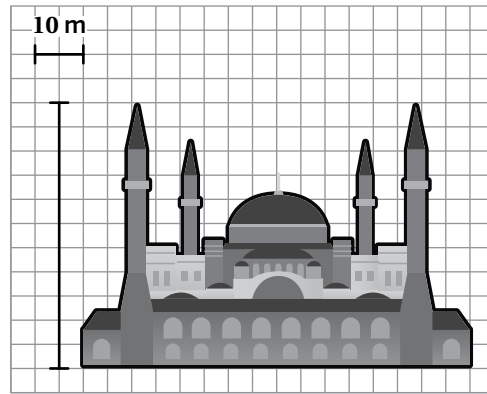
1.10

Here are two scale drawings of the Hagia Sophia in Istanbul, Turkey.

Complete the scale. What is the unknown value in the scale?



Explain your thinking.



Show What You Know Lesson 1

Name: _____ Date: _____ Period: _____

Show What You Know 1.01

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

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

Explanations vary.

- Figure *B* is not a scaled copy of figure *A* because the side lengths are not proportional. The figures are the same height, but not the same width.
- Figure *D* is not a scaled copy of figure *A* because they're not the same shape. The two figures are the same height and width, but the area of figure *D* is greater.
- Figure *F* is not a scaled copy of figure *A* because the side lengths don't make equivalent ratios. The height ratio is $\frac{3}{2}$ and the width ratio is $\frac{3}{4}$.

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Show What You Know Lesson 2

Name: _____ Date: _____ Period: _____

Show What You Know 1.02

Figure *B* is a scaled copy of figure *A*.

Determine and label the missing side lengths of figure *B*.

Explain your thinking.

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

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Show What You Know Lesson 3

Name: _____ Date: _____ Period: _____

Show What You Know 1.03

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

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Show What You Know Lesson 4

Name: _____ Date: _____ Period: _____

Show What You Know 1.04

What scale factor makes figure *A* match figure *B*?

$\frac{5}{2}$


What scale factor makes figure *B* match figure *A*?

$\frac{2}{5}$

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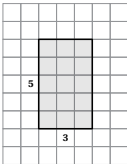
Show What You Know Lesson 5

Name: _____ Date: _____ Period: _____

Show What You Know  1.05

Imagine scaling this rectangle using a scale factor of 4.


What is the area of the scaled copy?
240 square units



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Show What You Know Lesson 6

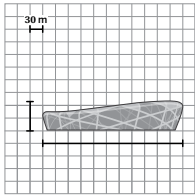
Name: _____ Date: _____ Period: _____

Show What You Know  1.06

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

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


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



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Show What You Know Lesson 7

Name: _____ Date: _____ Period: _____

Show What You Know  1.07


A scale drawing of a school bus has a scale of $\frac{1}{4}$ inch to 5 feet. If the length of the school bus is 4 inches on the scale drawing, what is the actual length of the bus?
40 feet

Show or explain your thinking.
 Explanations vary. The scale drawing is 4 inches, so there are $4 \div \frac{1}{4} = 8$ half-inches in the drawing. Because each half-inch represents 5 feet, the actual length of the bus is $8 \times 5 = 40$ feet.


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Show What You Know Lesson 8

Name: _____ Date: _____ Period: _____

Show What You Know  1.08


A park has a rectangular swimming pool that is 50 meters long and 25 meters wide. Use a ruler to make a scale drawing of the swimming pool where 1 centimeter represents 10 meters. Label the side lengths of your scale drawing.



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Show What You Know Lesson 9

Name: _____ Date: _____ Period: _____

Show What You Know  **1.09**


Aaliyah is making a scale drawing of a rectangular swimming pool. The pool is 50 meters long and 25 meters wide. She originally used a scale of 1 centimeter to 10 meters for her drawing of the pool.

- Aaliyah needs her drawing to be larger. Suggest a new scale for Aaliyah.
Responses vary. 1 centimeter to 5 meters
- Determine the side lengths of the scale drawing using the new scale.
Responses vary. If she uses a scale of 1 centimeter to 5 meters, the scale drawing will be 10 centimeters long and 5 centimeters wide.

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Show What You Know Lesson 10

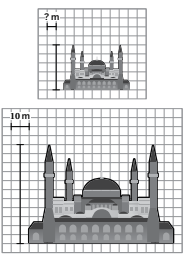
Name: _____ Date: _____ Period: _____

Show What You Know  **1.10**

Here are two scale drawings of the Hagia Sophia in Istanbul, Turkey.

Complete the scale. What is the unknown value in the scale?
11 meters

Explain your thinking.
Explanations vary. In the bottom drawing, 2 units represent 10 meters, so 1 unit represents 5 meters. The Hagia Sophia is 11 units tall in this drawing, so the actual height is $\frac{11}{2} = 5.5$ meters. In the top drawing, the Hagia Sophia is 5 units tall, so each unit must represent 11 meters.



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Unit 2

Assessments and Rubrics

Pre-Unit Check

Unit 2

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

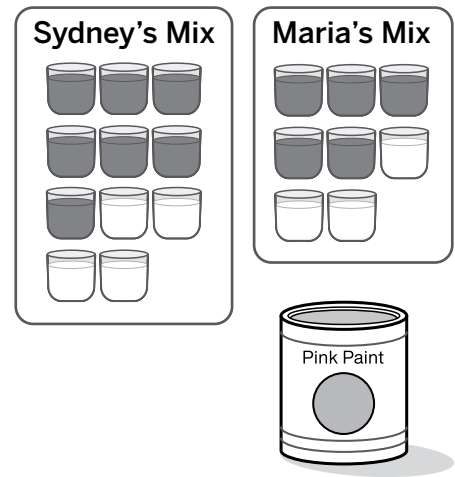
2. The ratio of the number of hippos to the number of crocodiles at a watering hole is 4 : 3.
How many crocodiles would there be if there were 24 hippos?

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

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

Are their batches the same color of pink?

Explain your thinking.



4. Antwon makes hot chocolate by mixing 2 cups of milk with 5 tablespoons of cocoa.
 - a How many tablespoons of cocoa would he need for 1 cup of milk?

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

Pre-Unit Check (continued)

Unit 2

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

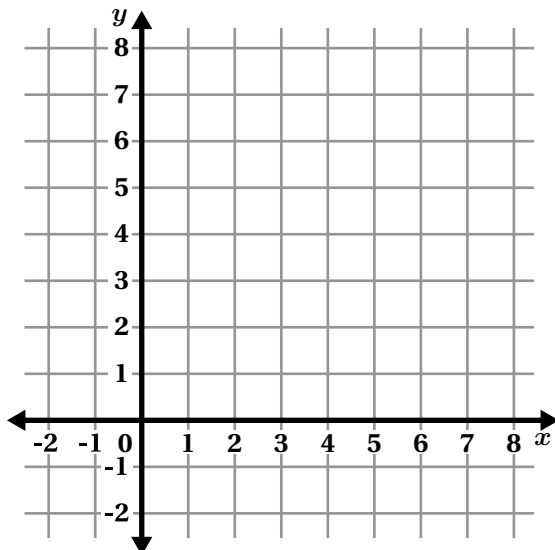
Time (hr)	Distance Traveled (mi)
2	
3	1,650
6	

6. Blueberries cost \$4.00 per pound.
- a How many pounds of blueberries can you buy for \$1.00?
 - b How many pounds of blueberries can you buy for \$13.00?

Explain or show your thinking.

7. The table shows some coordinate pairs.

Plot these points in the coordinate plane.



x	y
4	3
2	6
5	0

Sub-Unit Quiz**Unit 2**

1. Which table represents a proportional relationship?

A.

x	y
2	3
4	5
10	11

B.

x	y
2	4
4	5
10	6

C.

x	y
2	4
4	16
10	100

D.

x	y
2	3
4	6
10	15

2. Select *all* of the proportional relationships.

A. $y = 2.5x$

 B. A turtle walks for 5 minutes, then stops for a minute.

 C. A turtle starts at the starting line and walks at a constant rate.

D. $y = \frac{2.5}{x}$

E. $y = \frac{5}{2}x$

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

- a What does 0.75 mean in this situation?
- b How many cups of water does Jordan need for 4 cups of flour?
- c How many cups of flour does Jordan need for 1 cup of water?

Sub-Unit Quiz (continued)

Unit 2

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

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

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

b What is a constant of proportionality for this relationship?

What does it represent in this situation?

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

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

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

a Write two different constants of proportionality for this relationship.

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

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

Standard	MA.7.AR.3.2	MA.7.AR.4.1	MA.7.AR.4.2	MA.7.AR.4.4	MA.7.AR.4.5
Problem(s)	3a, 4a	1, 2	4b, 5a	2, 4c, 5b	3a, 3b, 3c, 5c

Problem 1		Standards: MA.7.AR.4.1, MTR.5.1									
4 Meeting	3 Approaching	2 Developing	1 Beginning								
<p>Correct choice:</p> <table border="1" style="border-style: dashed; border-color: red;"> <thead> <tr> <th>x</th> <th>y</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>3</td> </tr> <tr> <td>4</td> <td>6</td> </tr> <tr> <td>10</td> <td>15</td> </tr> </tbody> </table>	x	y	2	3	4	6	10	15			<p>Incorrect choice.</p> <p>Students who select the table with ordered pair (10, 100) may have noticed that the value of y is the value of x multiplied by itself.</p>
x	y										
2	3										
4	6										
10	15										

Problem 2		Standards: MA.7.AR.4.1, MA.7.AR.4.4	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>All correct choices and no incorrect choices.</p> <ul style="list-style-type: none"> • $y = 2.5x$ • A turtle starts at the starting line and walks at a constant rate. • $y = \frac{5}{2}x$ 	<p>One or two correct choices and no incorrect choices.</p> <p>All correct choices and one incorrect choice.</p> <p>Students who select the turtle that stops for a minute may need more support representing the situation as a table or graph to see that it is not proportional.</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.7.AR.3.2, MA.7.AR.4.5, MTR.6.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: <i>Responses vary. 0.75 means that 0.75 cups of water must be mixed with each cup of flour.</i></p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write “0.75 cups of flour must be mixed with each cup of water” may have reversed the variables in the context.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response does not reference both cups of flour and cups of water.</p>	<p>Response shows limited understanding.</p>

Problem 3b			
Standard: MA.7.AR.4.5			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: <i>3 cups of water (or equivalent)</i></p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write “5.33 cups” may have determined the number of cups of flour instead of cups of water.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>

Problem 3c			
Standard: MA.7.AR.4.5			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: <i>$\frac{4}{3}$ cups of flour (or equivalent)</i></p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write “0.75 cups” may have determined the number of cups of water instead of cups of flour.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>

Problem 4a		Standard: MA.7.AR.3.2											
4 Meeting	3 Approaching	2 Developing	1 Beginning										
<p>Correct response: All correct answers (or equivalent)</p> <table border="1"> <thead> <tr> <th>Blue Paint (cups), b</th> <th>Red Paint (cups), r</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>$\frac{3}{2}$</td> </tr> <tr> <td>2</td> <td>3</td> </tr> <tr> <td>$\frac{14}{3}$</td> <td>7</td> </tr> <tr> <td>10</td> <td>15</td> </tr> </tbody> </table>	Blue Paint (cups), b	Red Paint (cups), r	1	$\frac{3}{2}$	2	3	$\frac{14}{3}$	7	10	15	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write $\frac{2}{3}$, $\frac{21}{2}$, and $\frac{20}{3}$ may have calculated the other constant of proportionality.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>
Blue Paint (cups), b	Red Paint (cups), r												
1	$\frac{3}{2}$												
2	3												
$\frac{14}{3}$	7												
10	15												

Problem 4b		Standard: MA.7.AR.4.2	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p>(or equivalent) or (or equivalent)</p> <p>Explanations vary.</p> <ul style="list-style-type: none"> The constant of proportionality $\frac{3}{2}$ represents the number of cups of red paint needed for each cup of blue paint. The constant of proportionality $\frac{2}{3}$ represents the number of cups of blue paint needed for each cup of red paint. 	<p>Correct response with minor flaws in explanation.</p> <p>E.g., Response includes the correct constant of proportionality but has an inaccurate explanation.</p> <p>Incorrect response with logical and complete explanation.</p> <p>E.g., Response incorrectly names the constant of proportionality but has an accurate explanation.</p>	<p>Correct response with incomplete explanation.</p> <p>Incorrect response with explanation that shows partial understanding.</p> <p>E.g., Response includes both inaccurate constants and explanations but references a relationship between cups of blue paint and red paint.</p>	<p>Incorrect response with no explanation.</p>

Problem 4c			
Standards: MA.7.AR.4.4, MTR.7.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>$r = \frac{3}{2}b$ (or equivalent) or $b = \frac{2}{3}r$ (or equivalent)</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response includes a correctly structured equation based on an incorrect constant of proportionality from part 4b.</p> <p>Students who write $r = \frac{2}{3}b$ or $b = \frac{3}{2}r$ may have reversed the variables in the context.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write $r = b + 1$ may have noticed that 2 cups of blue paint and 3 cups of red paint make this equation true.</p>	<p>Response shows limited understanding.</p>

Problem 5a			
Standard: MA.7.AR.4.2			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>15 (or equivalent), $\frac{1}{15}$ (or equivalent)</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Responses are reciprocals of each other.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p> <p>Students who write 30 and 2 may have used the values from the description.</p>

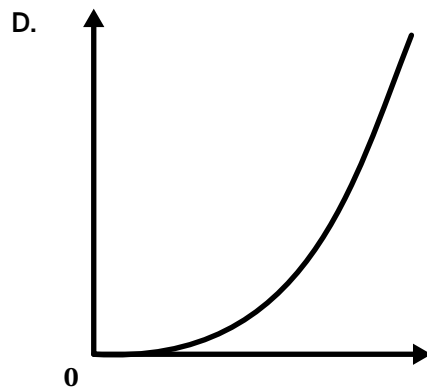
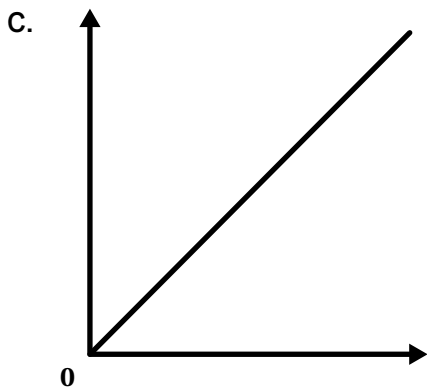
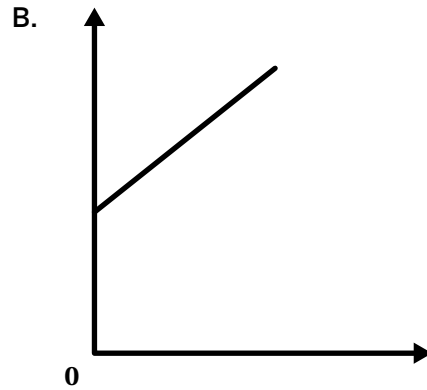
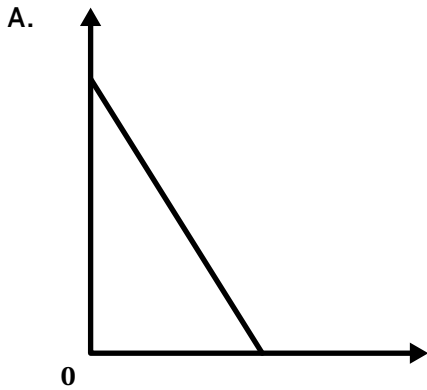
Problem 5b			
Standards: MA.7.AR.4.4, MTR.7.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>$t = 15d$ (or equivalent), $d = \frac{1}{15}t$ (or equivalent)</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response includes correctly structured equations based on incorrect constants of proportionality from part 5a.</p> <p>Students who write $d = 15t$ and $t = \frac{1}{15}d$ may have reversed the variables in the context.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write an equation in the form $d = kt$ or $t = kd$ may understand what makes an equation proportional.</p>	<p>Response shows limited understanding.</p>

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

End-of-Unit Assessment

Unit 2

1. Which graph represents a proportional relationship?

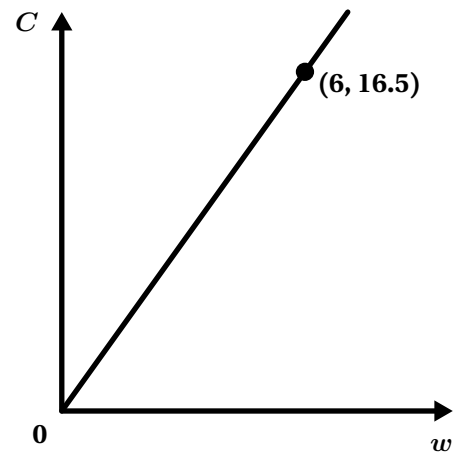


2. This graph shows the cost in dollars, C , of w pounds of blueberries.

The relationship between C and w is proportional.

Select *all* of the true statements.

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



End-of-Unit Assessment (continued)

Unit 2

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

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

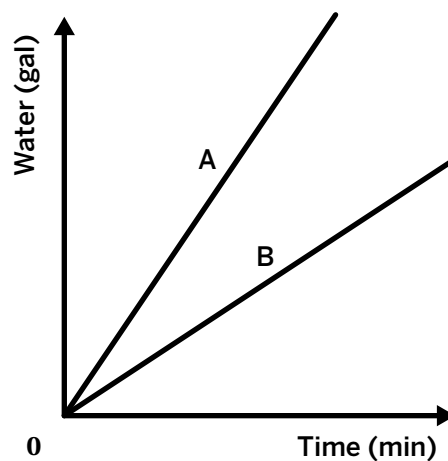
- A. $t = 5d$ B. $t = \frac{1}{5}d$ C. $t = d + 4$ D. $t = d - 4$

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

Which tank is filling more quickly? Circle one.

Tank A Tank B Not enough information

Explain or show your thinking.



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

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

Number of Raspberries	Weight (kg)
40	
100	0.40
300	

End-of-Unit Assessment (continued)**Unit 2**

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

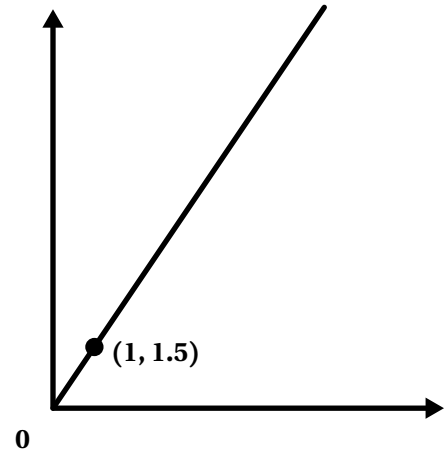
Is there a proportional relationship between C and F ?

Explain or show your thinking.

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

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

- a Label the axes to represent the situation.

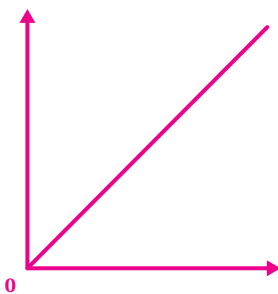


- b Write an equation for the line.

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

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

Standard	MA.7.AR.3.2	MA.7.AR.4.1	MA.7.AR.4.2	MA.7.AR.4.4	MA.7.AR.4.5
Problem(s)	5, 6, 7a	1	2	3, 7b	4, 7c

Problem 1		Standard: MA.7.AR.4.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice:</p> 			<p>Incorrect choice.</p> <p>Students who select either of the linear graphs that are not proportional may know that the graph of a proportional relationship is linear, but not that the line must contain $(0, 0)$.</p> <p>Students who select the curved graph may know that the graph contains $(0, 0)$, but not that the graph must be linear.</p>

Problem 2		Standards: MA.7.AR.4.2, MTR.6.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Both correct choices and no incorrect choices.</p> <ul style="list-style-type: none"> • A constant of proportionality is \$2.75. • 12 pounds of blueberries cost \$33. 	<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			
Standards: MA.7.AR.4.4, MTR.7.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice:</p> <p>$t = 5d$</p>			<p>Incorrect choice.</p> <p>Students who select $t = \frac{1}{5}d$ may have reversed the variables in the context or may think that these equations always contain a fraction.</p> <p>Students who select $t = d + 4$ may have noticed that 1 mile in 5 minutes makes this equation true.</p>

Problem 4			
Standards: MA.7.AR.4.5, MTR.4.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p>Tank A. Explanations vary. I know Tank A is filling more quickly because it's represented by the steeper graph. I can also choose a time and see how much water is in the two tanks at that moment.</p>	<p>Correct response with minor flaws in explanation.</p> <p>E.g., Response identifies Tank A but includes incorrect or imprecise description of the rates.</p> <p>Incorrect response with logical and complete explanation.</p> <p>Students who select <i>Tank B</i> may have answered the question "Which tank is filling more slowly?"</p>	<p>Correct response with incomplete explanation.</p> <p>Incorrect response with explanation that shows partial understanding.</p> <p>E.g., Response includes an incorrect answer with an explanation showing partial understanding of proportional relationships represented with a graph.</p>	<p>Incorrect response with no explanation.</p>

Problem 5		Standard: MA.7.AR.3.2											
4 Meeting	3 Approaching	2 Developing	1 Beginning										
<p>Correct response:</p> <table border="1"> <thead> <tr> <th>Number of Raspberries</th> <th>Weight (kg)</th> </tr> </thead> <tbody> <tr> <td>40</td> <td>0.16 (or equivalent)</td> </tr> <tr> <td>100</td> <td>0.40</td> </tr> <tr> <td>300</td> <td>1.2 (or equivalent)</td> </tr> </tbody> </table>		Number of Raspberries	Weight (kg)	40	0.16 (or equivalent)	100	0.40	300	1.2 (or equivalent)	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response includes the correct weight for either 40 or 300 raspberries but not both.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write that 300 raspberries weigh 0.12 kilograms may have multiplied 0.4 and 3 incorrectly.</p>	<p>Response shows limited understanding.</p> <p>E.g., Response includes incorrect weights for both 40 and 300 raspberries.</p> <p>Students who write that 300 raspberries weigh 2.40 kilograms may have used addition instead of multiplication.</p>	
Number of Raspberries	Weight (kg)												
40	0.16 (or equivalent)												
100	0.40												
300	1.2 (or equivalent)												

Problem 6		Standards: MA.7.AR.3.2, MTR.3.1		
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response and complete explanation.</p> <p><i>No. Explanations vary.</i></p> <p>The equation $F = \frac{9}{5}C + 32$ is not in the form $y = (\text{something})x$.</p>	<p>Correct response with minor flaws in explanation.</p> <p>Incorrect response with logical and complete explanation.</p> <p>Students who write that the equation is proportional may have noticed the fraction $\frac{9}{5}$ multiplied by a variable and assumed that this is enough to prove the relationship is proportional.</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 7a		Standard: MA.7.AR.3.2	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>The vertical axis should be labeled “Cookie Batter (tbsp)” and the horizontal axis should be labeled “Chocolate Chips (tbsp).”</p>		<p>Response shows incomplete understanding with significant errors.</p> <p>Students who label the horizontal axis “tablespoons of cookie batter” may have misinterpreted the meaning of the situation or were not sure how to connect the situation with the point (1, 1.5) on the graph.</p>	<p>Response shows limited understanding.</p> <p>Students who label the axes as quantities other than “tablespoons of chocolate chips” and “tablespoons of cookie batter” may have misunderstood the variables in the situation.</p>

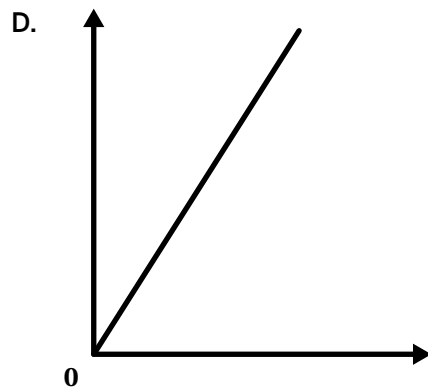
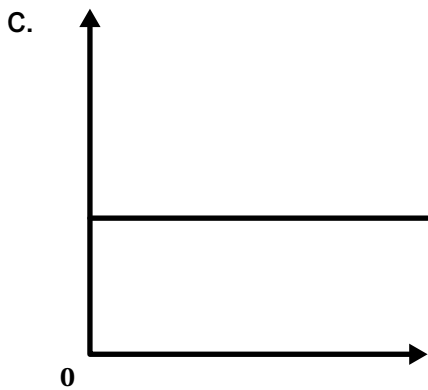
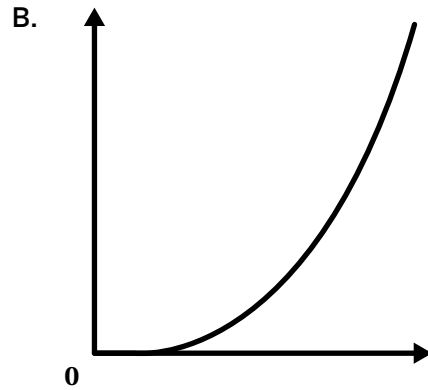
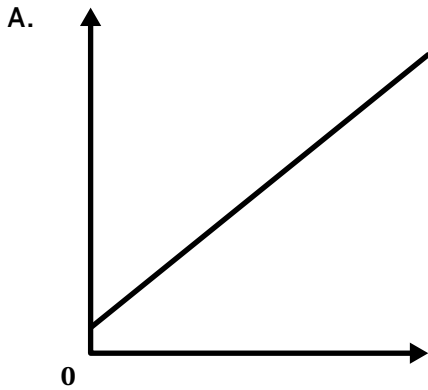
Problem 7b		Standard: MA.7.AR.4.4	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>$b = 1.5c$ (or equivalent)</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write $c = 1.5b$ or $b = \frac{2}{3}c$ may have reversed the variables in the context.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write $b = 1.5$ or $c = \frac{2}{3}$ may have calculated a unit rate instead of writing an equation for the relationship.</p>	<p>Response shows limited understanding.</p> <p>Students who write $b = c + 0.5$ may have noticed that 1 tablespoon of chocolate chips and 1.5 tablespoons of cookie batter makes this equation true.</p>

Problem 7c		Standards: MA.7.AR.4.5, MTR.6.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>Explanations vary. The point (1, 1.5) tells me that the recipe uses 1 tablespoon of chocolate chips for every 1.5 tablespoons of cookie batter. This point gives a unit rate.</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response accurately describes the meaning of the point in context but lacks details such as units in the explanation.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response mentions the point in relation to cookie batter and chocolate chips, but is not clear.</p>	<p>Response shows limited understanding.</p>

End-of-Unit Assessment

Unit 2

1. Which graph represents a proportional relationship?

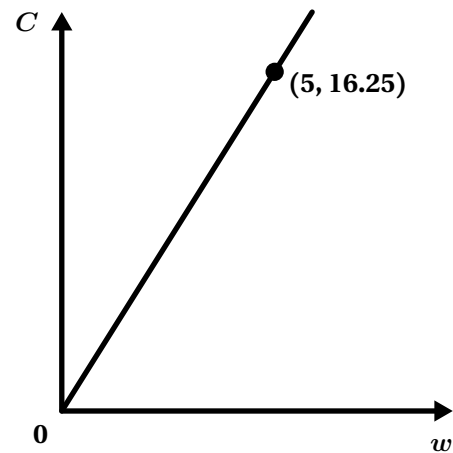


2. This graph shows the cost in dollars, C , of w pounds of strawberries.

The relationship between C and w is proportional.

Select *all* of the true statements.

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



End-of-Unit Assessment (continued)

Unit 2

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

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

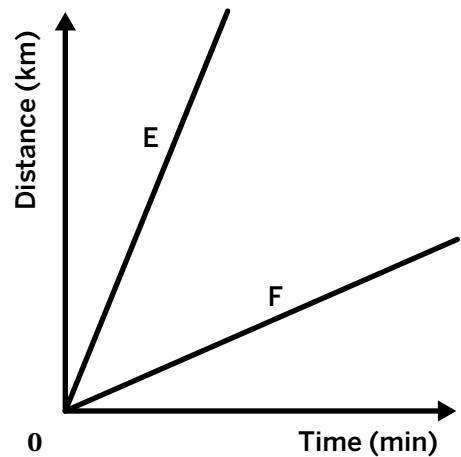
- A. $t = d + 14$ B. $t = d - 14$ C. $t = 15d$ D. $t = \frac{1}{15}d$

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

Which runner ran more slowly? Circle one.

Runner E Runner F Not enough information

Explain or show your thinking.



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

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

Number of Blueberries	Weight (kg)
60	
100	0.60
400	

End-of-Unit Assessment (continued)**Unit 2**

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

Is there a proportional relationship between p and x ?

Explain or show your thinking.

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

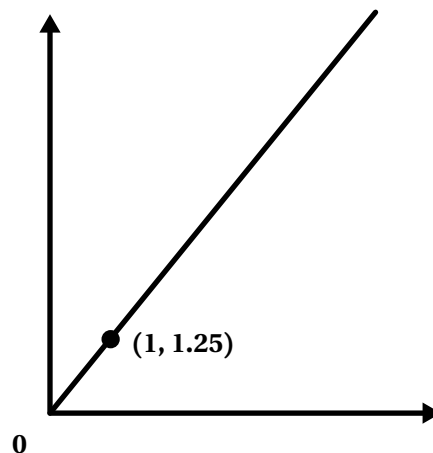
This line represents the relationship between the amount of flour and the amount of water needed for this recipe. The point $(1, 1.25)$ is on the line.

- a Label the axes to represent the situation.

- b Write an equation for the line.

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

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



Standard	MA.7.AR.3.2	MA.7.AR.4.1	MA.7.AR.4.2	MA.7.AR.4.4	MA.7.AR.4.5
Problem(s)	5, 6, 7a	1	2	3, 7b	4, 7c

Problem 1		Standard: MA.7.AR.4.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice:</p> 			<p>Incorrect choice.</p> <p>Students who select either of the not proportional linear graphs that the graph of a proportional relationship is linear, but not that the line must contain $(0, 0)$.</p> <p>Students who select the curved graph may know that the graph contains $(0, 0)$, but not that the graph must be linear.</p>

Problem 2		Standards: MA.7.AR.4.2, MTR.6.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Both correct choices and no incorrect choices.</p> <ul style="list-style-type: none"> • A constant of proportionality is \$3.25. • 4 pounds of strawberries cost \$13. 	<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			
Standards: MA.7.AR.4.4, MTR.7.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice:</p> <p>$t = 15d$</p>			<p>Incorrect choice.</p> <p>Students who select $t = \frac{1}{15}d$ may have reversed the variables in the context or may think that these equations always contain a fraction.</p> <p>Students who select $t = d + 14$ may have noticed that 1 mile in 15 minutes makes this equation true.</p>

Problem 4			
Standards: MA.7.AR.4.5, MTR.4.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p><i>Runner F. Explanations vary. I know that Runner F ran slower because Runner F's graph is less steep. Another way to figure out which person ran slower is to choose a time and see which runner traveled the shorter distance in that time.</i></p>	<p>Correct response with minor flaws in explanation.</p> <p>E.g., Response identifies Runner F but includes incorrect or imprecise description of the rates.</p> <p>Incorrect response with logical and complete explanation.</p> <p>Students who select <i>Runner E</i> may have answered the question "Which runner is running more quickly?"</p>	<p>Correct response with incomplete explanation.</p> <p>Incorrect response with explanation that shows partial understanding.</p> <p>E.g., Response includes an incorrect answer with an explanation showing partial understanding of proportional relationships represented with a graph.</p>	<p>Incorrect response with no explanation.</p>

Problem 5		Standard: MA.7.AR.3.2									
4 Meeting	3 Approaching	2 Developing	1 Beginning								
<p>Correct response:</p> <table border="1"> <thead> <tr> <th>Number of Blueberries</th> <th>Weight (kg)</th> </tr> </thead> <tbody> <tr> <td>60</td> <td>0.36 (or equivalent)</td> </tr> <tr> <td>100</td> <td>0.60</td> </tr> <tr> <td>400</td> <td>2.4 (or equivalent)</td> </tr> </tbody> </table>	Number of Blueberries	Weight (kg)	60	0.36 (or equivalent)	100	0.60	400	2.4 (or equivalent)	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response includes the correct weight for either 60 or 400 blueberries but not both.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write that 400 blueberries weigh 0.24 kilograms may have multiplied 0.6 and 4 incorrectly.</p>	<p>Response shows limited understanding.</p> <p>E.g., Response includes incorrect weights for both 60 and 400 blueberries.</p> <p>Students who write that 400 blueberries weigh 3.60 kilograms may have used addition instead of multiplication.</p>
Number of Blueberries	Weight (kg)										
60	0.36 (or equivalent)										
100	0.60										
400	2.4 (or equivalent)										

Problem 6		Standards: MA.7.AR.3.2, MTR.3.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p><i>Yes. Explanations vary. One way to decide if a relationship is proportional is to look at the equation and see if it has the form $y = (\text{something})x$. The “something” is the constant of proportionality. In this case, 2.22 is the constant of proportionality.</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 mentions multiplication without making a connection to constants of proportionality.</p> <p>Incorrect response with explanation that shows partial understanding.</p>	<p>Incorrect response with no explanation.</p>

Problem 7a		Standard: MA.7.AR.3.2	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>The vertical axis should be labeled “Flour (cups)” and the horizontal axis should be labeled “Water (cups).”</p>		<p>Response shows incomplete understanding with significant errors.</p> <p>Students who label the horizontal axis “cups of flour” may have misinterpreted the meaning of the situation or were not sure how to connect the situation with the point (1, 1.25) on the graph.</p>	<p>Response shows limited understanding.</p> <p>Students who label the axes as quantities other than “Flour (cups)” and “Water (cups)” may have misunderstood the variables in the situation.</p>

Problem 7b		Standard: MA.7.AR.4.4	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>$f = 1.25w$ (or equivalent)</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write $w = 1.25f$ or $f = \frac{4}{5}w$ may have reversed the variables in the context.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write $f = 1.25$ or $w = \frac{4}{5}$ may have calculated a unit rate instead of writing an equation for the relationship.</p>	<p>Response shows limited understanding.</p> <p>Students who write $f = w + 0.25$ may have noticed that 1 cup of water and 0.25 cups of flour makes this equation true.</p>

Problem 7c		Standards: MA.7.AR.4.5, MTR.6.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>Explanations vary. The point (1, 1.25) indicates that the recipe uses 1 cup of water for every 1.25 cups of flour.</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response accurately describes the meaning of the point in context but lacks details such as units in the explanation.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response mentions the point in relation to water and flour, but is not clear.</p>	<p>Response shows limited understanding.</p>

Unit 2

**Show What You
Know PDFs**

Show What You Know**2.01**

Group together the mixtures that make the same color of paint.

A. 12 cups white
15 cups red

B. 4 cups white
5 cups red

C. 3 cups white
4 cups red

D. $\frac{3}{4}$ cups white
1 cup red

E. 1 cup white
1.25 cups red

Group 1**Group 2**

Show What You Know**2.02**

Complete the table so that it represents a proportional relationship.

x	y
0	0
6	20
3	
	200

Show What You Know

**2.03**

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

- a** What is a constant of proportionality in this relationship?
- b** What does that constant of proportionality mean in the situation?

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

Show What You Know



2.04

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

- a** Complete the table.

Weeks, w	Fortnights, f
1	
2	1
8	

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

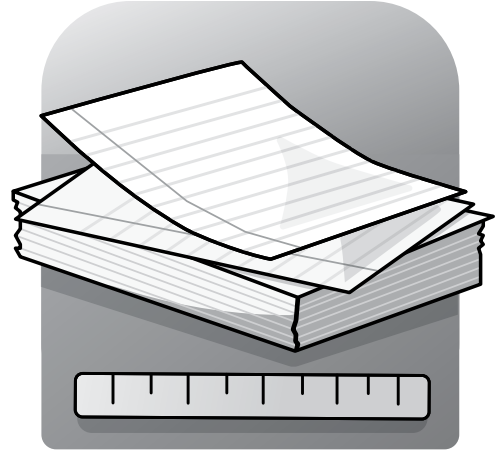
Show What You Know



2.05

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

What does 2.5 mean in this situation?



Show What You Know

**2.07**

Select *all* the equations that represent proportional relationships.

A. $180 - x = y$

B. $1.08x = y$

C. $y = x^8$

D. $y = \frac{x}{8}$

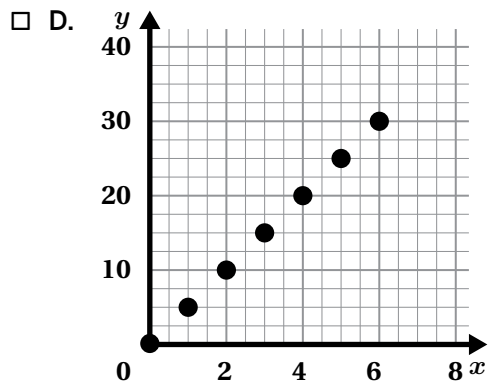
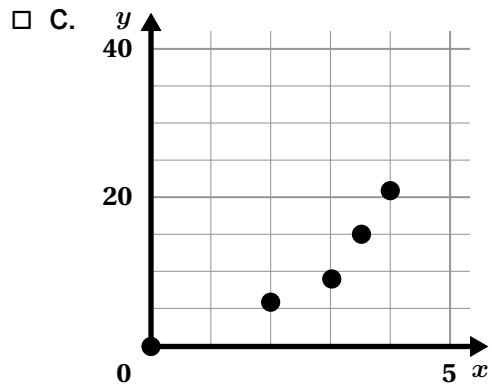
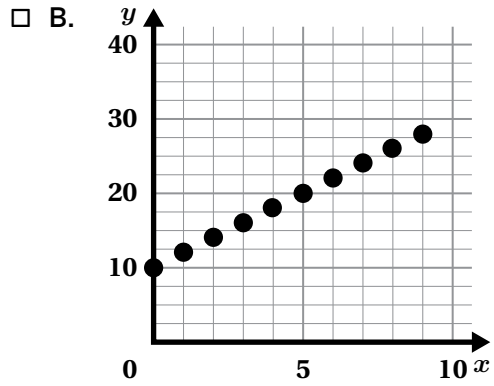
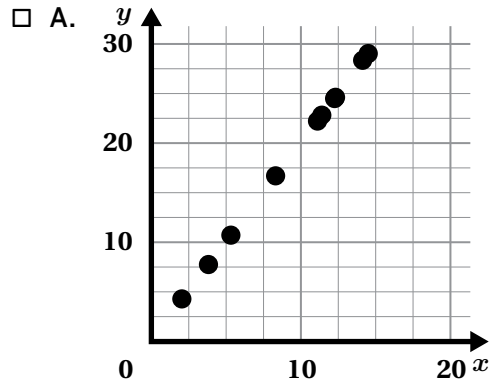
E. $y = 8x$

Show What You Know



2.08

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



Show What You Know



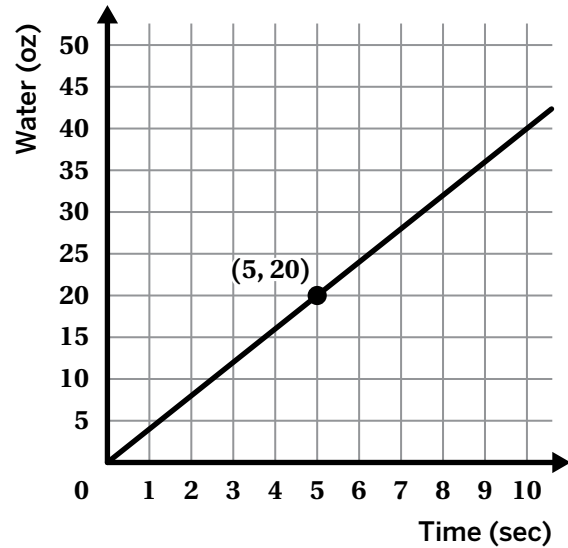
2.09

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

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

Select *all* the true statements.

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



Show What You Know



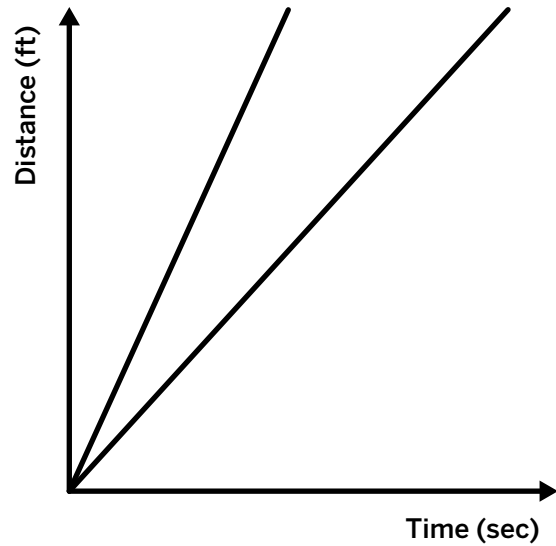
2.10

Kayla and Daniela started walking at constant speeds.

After 3 seconds:

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

- a Label each graph with the name it represents.
- b Write an equation for Kayla's walk, using d for distance and t for time.



Show What You Know



2.11

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

Description

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

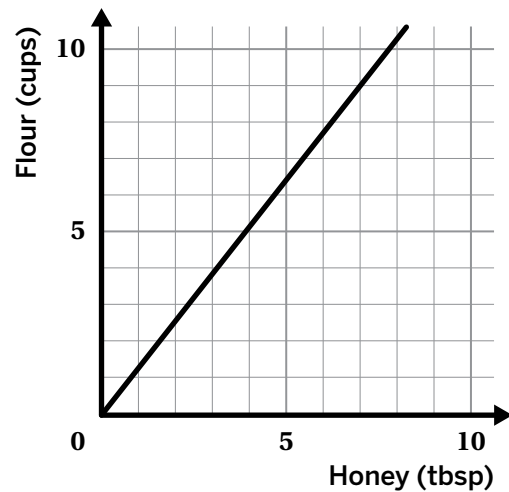
Equation

$$f = 1.25h$$

Table

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

Graph



Show What You Know Lesson 1

Name: _____ Date: _____ Period: _____

Show What You Know 2.01

Group together the mixtures that make the same color of paint.

A. 12 cups white 15 cups red	B. 4 cups white 5 cups red	C. 3 cups white 4 cups red
D. $\frac{3}{4}$ cups white 1 cup red	E. 1 cup white 1.25 cups red	

Group 1	Group 2
A, B, E	C, D

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Show What You Know Lesson 2

Name: _____ Date: _____ Period: _____

Show What You Know 2.02

Complete the table so that it represents a proportional relationship.

x	y
0	0
6	20
3	10
60	200

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Show What You Know Lesson 3

Name: _____ Date: _____ Period: _____

Show What You Know 2.03

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

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

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

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

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Show What You Know Lesson 4

Name: _____ Date: _____ Period: _____

Show What You Know 2.04

In Great Britain, two weeks is called a fortnight.

a) Complete the table.


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

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

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Show What You Know Lesson 5

Name: _____ Date: _____ Period: _____

Show What You Know  2.05

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


What does 2.5 mean in this situation?
 Responses vary. 2.5 inches is how tall one ream of paper is.



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Show What You Know Lesson 6

Name: _____ Date: _____ Period: _____

Show What You Know  2.06

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


a) What are two constants of proportionality for the relationship between distance, in kilometers, and time, in hours?
 $\frac{500}{4}$ (or equivalent) and $\frac{8}{400}$ (or equivalent)

b) Write two equations that relate distance, d , and time, t , in this situation.
 $d = \frac{500}{4}t$ (or equivalent) and $t = \frac{8}{400}d$ (or equivalent)

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Show What You Know Lesson 7

Name: _____ Date: _____ Period: _____

Show What You Know  2.07

Select all the equations that represent proportional relationships.

A. $180 - x = y$

B. $1.08x = y$

C. $y = x^2$


D. $y = \frac{x}{8}$

E. $y = 8x$

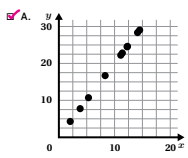
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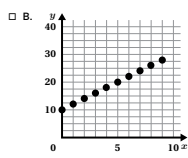
Show What You Know Lesson 8

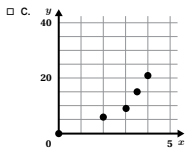
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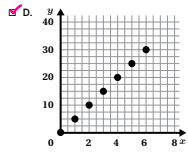
Show What You Know  2.08

Select all the graphs that could represent a proportional relationship.

A. 

B. 

C. 

D. 

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Show What You Know Lesson 9

Name: _____ Date: _____ Period: _____

Show What You Know 2.09

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

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

Select all the true statements.

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

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Show What You Know Lesson 10

Name: _____ Date: _____ Period: _____

Show What You Know 2.10

Kayla and Daniela started walking at constant speeds.

After 3 seconds:

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

a. Label each graph with the name it represents.

b. Write an equation for Kayla's walk, using d for distance and t for time.
 $d = 2t$ (or equivalent)

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Show What You Know Lesson 11

Name: _____ Date: _____ Period: _____

Show What You Know 2.11

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

Description
A baker uses 8 tablespoons of honey for every 10 cups of flour to make bread dough.
Responses vary. A constant of proportionality is the number of cups of flour for each tablespoon of honey: $\frac{10}{8}$.

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

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

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

Graph

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

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Show What You Know Lesson 12

Name: _____ Date: _____ Period: _____

Show What You Know 2.12

a. Name two quantities that you worked with in this lesson that are in a proportional relationship. Explain how you know.
Responses vary. The length of a shower and the water used during a shower are in a proportional relationship because there is a constant amount of water coming out of the shower head. The amount of water used divided by the amount of time spent in the shower is always the same number.


b. What are two constants of proportionality for this relationship?
Responses vary. If the rate of water coming from the shower is 2.5 gallons per minute, then 2.5 and $\frac{1}{2.5}$ are constants of proportionality.

c. What do these constants of proportionality tell us about the situation?
Responses vary. These constants of proportionality tell me about the relationship between the length of a shower and how much water is used.

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Show What You Know Lesson 13

Name: _____ Date: _____ Period: _____

Show What You Know  2.13

Think about what you learned in this unit.

a What are some ways to represent a proportional relationship?
Responses vary. A proportional relationship can be represented in a table of values, in an equation of the form $y = kx$, on a graph of a line that passes through the origin, and in a verbal description.

b Choose one of the representations you've used for a proportional relationship. Describe where you might see this representation outside of math class.
Responses vary.

c What questions do you still have about proportional relationships?
Responses vary.

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Unit 3

Assessments and Rubrics

Pre-Unit Check

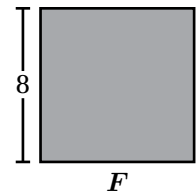
Unit 3

1. A ticket at a movie theater costs \$9.25.

- a What is the total cost for 20 tickets?
- b Write an equation to represent the relationship between the number of tickets purchased, n , and the total cost of the tickets, c .
- c How many tickets were purchased if the total cost of tickets was \$240.50?

Explain your thinking.

2. Here are three squares:



a Complete the table with information about each square.

Square	Side Length (in.)	Perimeter (in.)	Area (sq. in.)
D	3	12	9
E		20	
F	8		

- b Write an equation for the relationship between the perimeter of the square, P , and its side length, l .
- c Write an equation for the relationship between the area of the square, A , and its side length, l .

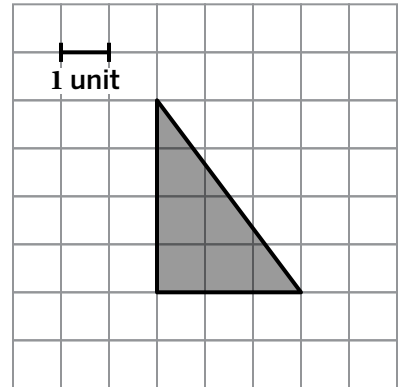
Pre-Unit Check (continued)

Unit 3

3. One formula for the area of a triangle is $A = \frac{1}{2} \cdot b \cdot h$.

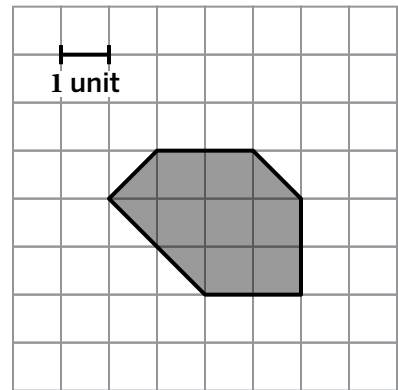
The variable b represents the length of the base of the triangle and h represents its height.

What is the area of this triangle?



4. Use any strategy to determine the area of this figure. Draw on the figure if it helps you with your thinking.

Explain your thinking.



5. The area of this shape is $4 \cdot 3^2$ square units.

What is another way to write the shape's area?

- A. 36 square units
- B. 144 square units
- C. Neither



Explain your thinking.

Sub-Unit Quiz

Unit 3

1. Select *all* the choices that represent proportional relationships.

A.

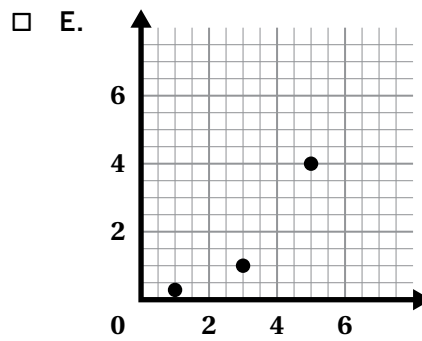
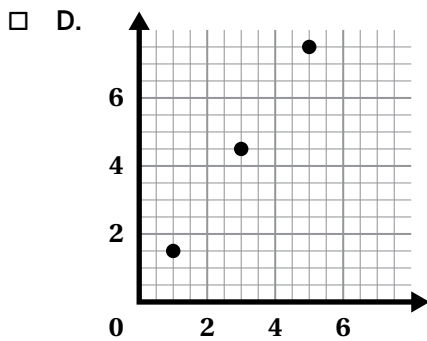
x	y
1	3
2	6
3	9

B.

x	y
12	6
8	4
2	1

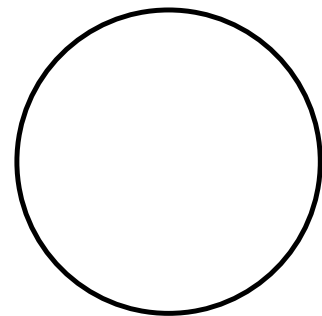
C.

x	y
2	5
3	10
4	20



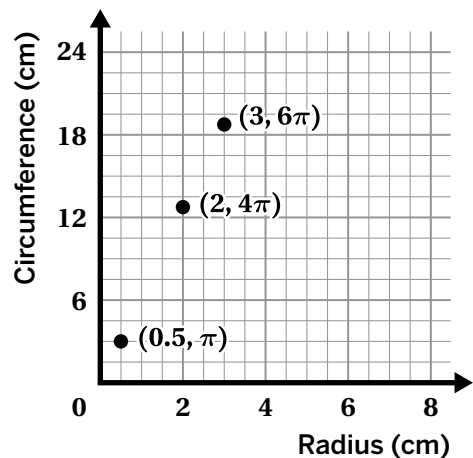
2. This circle has a circumference of 40 centimeters.
What is the length of its diameter?

- A. 40π centimeters
- B. $\frac{20}{\pi}$ centimeters
- B. $\frac{40}{\pi}$ centimeters
- D. 20 centimeters



3. Here is a graph of the radius and circumference measurements of several circles.

What is a constant of proportionality in this relationship?

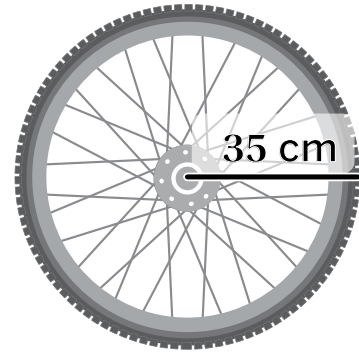


Sub-Unit Quiz (continued)

Unit 3

4. A wheel has a radius of 35 centimeters.


- a Determine its circumference.





- b Complete the table showing how far this wheel travels for each number of rotations.


Number of Rotations	Distance (cm)
1	
2	140π
5	350π
10	

- c What is a constant of proportionality for this relationship?

 Standard	MA.7.AR.3.2	MA.7.AR.4.1	MA.7.AR.4.2	MA.7.GR.1.3
Problem(s)	4b	1	3, 4c	2, 4a

Problem 1		 Standard: MA.7.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"> • The table containing (1, 3) • The table containing (12, 6) • The graph containing (1, 1.5) 	<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 2		 Standard: MA.7.GR.1.3	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice:</p> <p>$\frac{40}{\pi}$ centimeters</p>			<p>Incorrect choice.</p> <p>Students who select 40π cm may have calculated the circumference for a circle whose diameter is 40 cm.</p> <p>Students who select $\frac{20}{\pi}$ cm may have calculated the radius of the circle.</p> <p>Students who select 20 cm may have calculated the radius for a circle with a diameter of 40 cm.</p>

Problem 3		 Standards: MA.7.AR.4.2	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>$2\pi \approx 6.28$ or $\frac{1}{2\pi} \approx 0.16$</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 4a				Standard: MA.7.GR.1.3
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response: <i>Responses vary.</i></p> <ul style="list-style-type: none"> • 70π centimeters • 219.8 centimeters • 220 centimeters 	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write “35π cm” may have calculated the circumference of a circle with a diameter of 35 cm.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write “70 cm” may have calculated the diameter of a circle with a radius of 35 cm.</p>	<p>Response shows limited understanding.</p>	

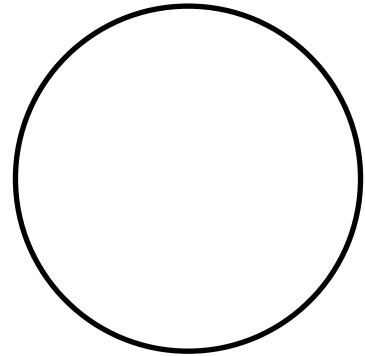
Problem 4b				Standards: MA.7.AR.3.2
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response: <i>Responses vary.</i></p> <ul style="list-style-type: none"> • 70π or 219.8 or 220 • 700π or 2198 or 2200 	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., One out of two responses correct.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>	

Problem 4c				Standard: MA.7.AR.4.2
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response: <i>Responses vary.</i></p> <ul style="list-style-type: none"> • 70π or $\frac{1}{70\pi}$ • 219.8 or 0.0045 • 220 or 0.0045 	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write 70 or $\frac{1}{70}$ may have overlooked π when they calculated the constant of proportionality.</p>	<p>Response shows limited understanding.</p>	

End-of-Unit Assessment

Unit 3

1. A circle has a radius of 50 centimeters. Which of these is closest to its area?
- A. 157 square centimeters
 - B. 314 square centimeters
 - C. 7,854 square centimeters
 - D. 15,708 square centimeters



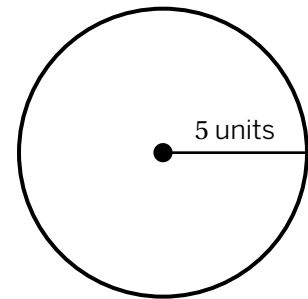
2. This circle has a radius of 5 units. Three students tried to calculate the circumference.

Order their answers from farthest from the exact circumference to closest to the exact circumference.

31.4 units	31.4π units	10π units

Farthest from exact circumference

Closest to exact circumference



3. Determine whether each relationship is proportional:

a The radius and circumference of a circle

Radius (cm)	Circumference (cm)
0	0
2	4π
5	10π

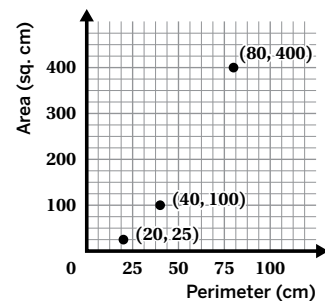
- Proportional
- Not proportional

b The radius and diameter of a circle

Radius (cm)	Diameter (cm)
5	10
10	20
15	30

- Proportional
- Not proportional

c The perimeter and area of a square



- Proportional
- Not proportional

End-of-Unit Assessment (continued)

Unit 3

4. Decide whether each quantity describes a circle's circumference or area. Circle your response.


- a The amount of paint needed to cover a circular canvas. Circumference Area
- b How long it takes to run around a circular track. Circumference Area
- c The amount of ribbon needed to wrap around a circular present. Circumference Area
- d The amount of grass inside of a circular track. Circumference Area


5. a Complete the table for the relationship between the radius and the area of a circle.


Radius (units)	Area (sq. units)
1	
2	
3	

b Explain how you know the relationship between the radius of a circle and its area is *not* proportional. Use the table if it helps with your thinking.

6. DeShawn needs grass seed to cover a circular field with a diameter of 200 feet. How many square feet does DeShawn need to cover with grass seed?

 Standard	MA.7.GR.1.3	MA.7.GR.1.4	MA.7.AR.4.1
Problem(s)	1, 2, 4, 5a	4, 5A, 5b, 6	3a, 3b, 3c

Problem 1		 Standard: MA.7.GR.1.3	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice:</p> <p>7,854 square centimeters</p>			<p>Incorrect choice.</p> <p>Students who select <i>157 square centimeters</i> may have multiplied the radius by π instead of squaring the radius first.</p> <p>Students who select <i>314 square centimeters</i> may have calculated the circumference of the circle instead of its area.</p> <p>Students who select <i>15,708 square centimeters</i> may have combined the circumference and area formulas, calculating $2\pi r^2$.</p>

Problem 2		 Standards: MA7.GR.1.3, MTR.3.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>From farthest from exact to closest to exact:</p> <ul style="list-style-type: none"> • 31.4π units • 31.4 units • 10π units 		<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response correctly identifies the farthest or closest measurement.</p> <ul style="list-style-type: none"> • 31.4π units • 10π units • 31.4 units <p>or</p> <ul style="list-style-type: none"> • 31.4 units • 31.4π units • 10π units 	<p>Response shows limited understanding.</p> <p>E.g., All responses are in the incorrect location.</p>

Problem 3 📍 Standard: MA.7.AR.4.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>All correct choices and no incorrect choices.</p> <p>Proportional (3a, 3b)</p> <ul style="list-style-type: none"> The radius and circumference of a circle The radius and diameter of a circle <p>Not Proportional (3c)</p> <ul style="list-style-type: none"> The perimeter and area of a square 		<p>Two correct choices and one incorrect choice.</p>	<p>Two or more incorrect choices.</p>

Problem 4a–d 📍 Standards: MA.7.GR.1.3, MA.7.AR.1.4			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>All correct choices and no incorrect choices.</p> <p>Area</p> <ul style="list-style-type: none"> The amount of paint The amount of grass <p>Circumference</p> <ul style="list-style-type: none"> How long it takes to run The amount of ribbon 	<p>Three correct choices and one incorrect choice.</p>	<p>Two correct choices and two incorrect choices.</p>	<p>Three or more incorrect choices.</p>

Problem 5a 📍 Standards: MA.7.GR.1.3, MA.7.AR.1.4											
4 Meeting	3 Approaching	2 Developing	1 Beginning								
<p>Correct response:</p> <p><i>Responses vary.</i></p> <table border="1" style="border-collapse: collapse; width: 100%;"> <thead> <tr> <th style="padding: 5px;">Radius (units)</th> <th style="padding: 5px;">Area (sq. units)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; padding: 5px;">1</td> <td style="padding: 5px;">$\pi, 3.14, \frac{22}{7}$</td> </tr> <tr> <td style="text-align: center; padding: 5px;">2</td> <td style="padding: 5px;">$4\pi, 12.56, \frac{88}{7}$</td> </tr> <tr> <td style="text-align: center; padding: 5px;">3</td> <td style="padding: 5px;">$9\pi, 28.26, \frac{198}{7}$</td> </tr> </tbody> </table>	Radius (units)	Area (sq. units)	1	$\pi, 3.14, \frac{22}{7}$	2	$4\pi, 12.56, \frac{88}{7}$	3	$9\pi, 28.26, \frac{198}{7}$	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response includes the correct area for two radius lengths.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write 2π, 4π, and 6π may have calculated the circumference instead of the area.</p>	<p>Response shows limited understanding.</p>
Radius (units)	Area (sq. units)										
1	$\pi, 3.14, \frac{22}{7}$										
2	$4\pi, 12.56, \frac{88}{7}$										
3	$9\pi, 28.26, \frac{198}{7}$										

Problem 5b		Standards: MA.7.AR.1.4	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p><i>Explanations vary.</i> The relationship is not proportional because there isn't a constant of proportionality. In the first row of the table, you multiply 1 by π to get the area, but in the second row of the table, you multiply 2 by 2π to get the area.</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response includes that there is not a constant of proportionality, but does not provide evidence or examples to support the claim.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response mentions a relationship between some of the numbers in the table but does not connect to a constant of proportionality.</p>	<p>Response shows limited understanding.</p>

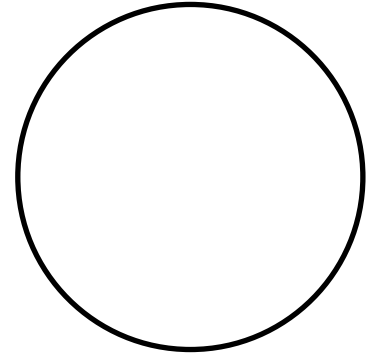
Problem 6		Standards: MA.7.AR.1.4, MTR.2.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p><i>Responses vary.</i></p> <ul style="list-style-type: none"> • 10000π sq. ft • 31400 sq. ft • $\frac{220000}{7}$ sq. ft 	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response identifies the radius of the field as 100 feet and correctly uses the formula for the area of a circle, but has a calculation error.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write “200π sq. ft” may have calculated the circumference.</p>	<p>Response shows limited understanding.</p>

End-of-Unit Assessment

Unit 3

1. A circle has a radius of 40 centimeters. Which of these is closest to its circumference?

- A. 126 centimeters
- B. 251 centimeters
- C. 1,600 centimeters
- D. 5,027 centimeters



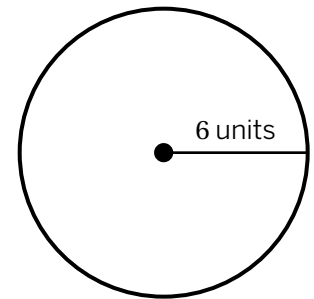
2. This circle has a radius of 6 units. Three students tried to calculate the area.

Order their answers from farthest from the exact area to closest to the exact area.

113.1 square units	36π square units	113.1π square units

Farthest from exact area

Closest to exact area



3. Determine whether each relationship is proportional:

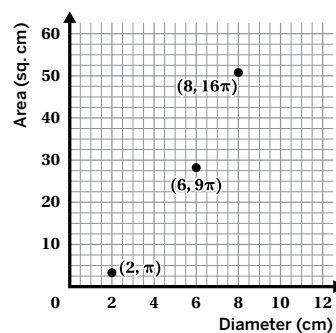
a The diameter and radius of a circle

b The diameter and area of a circle

c The radius and circumference of a circle

Diameter (cm)	Radius (cm)
8	4
16	8
24	12

- Proportional
- Not proportional



- Proportional
- Not proportional

Radius (cm)	Circumference (cm)
1	2π
3	6π
4	8π

- Proportional
- Not proportional

End-of-Unit Assessment (continued)

Unit 3

4. Decide whether each quantity describes a circle's circumference or area. Circle your response.

- | | | | |
|----------|---|---------------|------|
| a | The amount of glass in a circular window. | Circumference | Area |
| b | The number of tiles needed to go around a circular pool. | Circumference | Area |
| c | The amount of paint needed to paint a circular table top. | Circumference | Area |
| d | The distance a toy car travels around a circular track. | Circumference | Area |


5. a Complete the table for the relationship between the radius and the circumference of a circle.


Radius (units)	Circumference (units)
1	
2	
3	

b Explain how you know the relationship between the radius of a circle and its circumference is proportional. Use the table if it helps with your thinking.

6. Brielle needs to paint the bottom of a circular pool with a diameter of 24 feet. How many square feet does Brielle need to cover with paint?

 Standard	MA.7.GR.1.3	MA.7.GR.1.4	MA.7.AR.4.1
Problem(s)	1, 2, 4, 5a	4, 5A, 5b, 6	3a, 3b, 3c

Problem 1		 Standard: MA.7.GR.1.3	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice:</p> <p>251 square centimeters</p>			<p>Incorrect choice.</p> <p>Students who select <i>126 centimeters</i> may have multiplied the radius by π instead of the diameter.</p> <p>Students who select <i>5,027 centimeters</i> may have calculated the area of the circle instead of its circumference.</p> <p>Students who select <i>1,600 centimeters</i> may have calculated r^2.</p>

Problem 2		 Standards: MA7.GR.1.3, MTR.3.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>From farthest from exact to closest to exact:</p> <ul style="list-style-type: none"> • 113.1π sq. units • 113.1 sq. units • 36π sq. units 		<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response correctly identifies the farthest or closest measurement.</p> <ul style="list-style-type: none"> • 113.1π sq. units • 36π sq. units • 113.1 sq. units <p>or</p> <ul style="list-style-type: none"> • 113.1 sq. units • 113.1π sq. units • 36π sq. units 	<p>Response shows limited understanding.</p> <p>E.g., All responses are in the incorrect location.</p>

Problem 3				Standard: MA.7.AR.4.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>All correct choices and no incorrect choices.</p> <p>Proportional (3a, 3b)</p> <ul style="list-style-type: none"> The diameter and radius of a circle The radius and circumference of a circle <p>Not Proportional (3c)</p> <ul style="list-style-type: none"> The diameter and area of a circle 		<p>Two correct choices and one incorrect choice.</p>	<p>Two or more incorrect choices.</p>	

Problem 4a–d				Standards: MA.7.GR.1.3, MA.7.AR.1.4
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>All correct choices and no incorrect choices.</p> <p>Area</p> <ul style="list-style-type: none"> The amount of glass The amount of paint <p>Circumference</p> <ul style="list-style-type: none"> The number of tiles The distance a toy car travels 	<p>Three correct choices and one incorrect choice.</p>	<p>Two correct choices and two incorrect choices.</p>	<p>Three or more incorrect choices.</p>	

Problem 5a				Standards: MA.7.GR.1.3, MA.7.AR.1.4								
4 Meeting	3 Approaching	2 Developing	1 Beginning									
<p>Correct response:</p> <p><i>Responses vary.</i></p> <table border="1"> <thead> <tr> <th>Radius (units)</th> <th>Circumference (sq. units)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>$2\pi, 6.28, \frac{44}{7}$</td> </tr> <tr> <td>2</td> <td>$4\pi, 12.56, \frac{88}{7}$</td> </tr> <tr> <td>3</td> <td>$6\pi, 18.84, \frac{132}{7}$</td> </tr> </tbody> </table>	Radius (units)	Circumference (sq. units)	1	$2\pi, 6.28, \frac{44}{7}$	2	$4\pi, 12.56, \frac{88}{7}$	3	$6\pi, 18.84, \frac{132}{7}$	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response includes the correct circumference for two radius lengths but not all three.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write π, 4π, and 9π may have calculated the area instead of the circumference.</p>	<p>Response shows limited understanding.</p>	
Radius (units)	Circumference (sq. units)											
1	$2\pi, 6.28, \frac{44}{7}$											
2	$4\pi, 12.56, \frac{88}{7}$											
3	$6\pi, 18.84, \frac{132}{7}$											

Problem 5b				Standards: MA.7.AR.1.4
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response:</p> <p><i>Explanations vary. The relationship is proportional because there is a constant of proportionality. In each row of the table, you multiply the radius by 2π to get the circumference.</i></p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response includes that there is a constant of proportionality, but does not provide evidence or examples to support the claim.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response mentions a relationship between some of the numbers in the table but does not connect to a constant of proportionality.</p>	<p>Response shows limited understanding.</p>	

Problem 6				Standards: MA.7.AR.1.4, MTR.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"> • 144π sq. ft • 452.16 sq. ft • $\frac{3168}{7}$ sq. ft 	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response identifies the radius of the pool as 12 feet and correctly uses the formula for the area of a circle, but has a calculation error.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write “24π sq. ft” may have calculated the circumference.</p>	<p>Response shows limited understanding.</p>	

Unit 3

**Show What You
Know PDFs**

Show What You Know

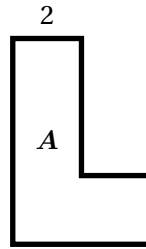


3.01

David created and measured several scaled copies of figure *A*.

What is the perimeter of a scaled copy that has a top side length of 6.5 units?

Explain your thinking.



Top Side Length (units)	Perimeter (units)
2	20
3.12	31.2
8	80
1.5	15

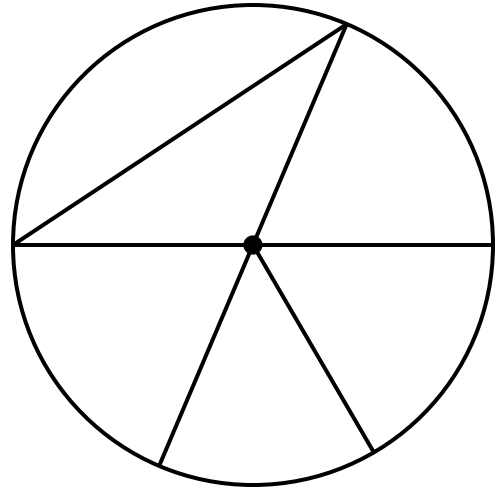
Show What You Know



3.02

The diagram shows several line segments and a point.
The point is located at the center of the circle.

- a Trace all the segments that are diameters.
- b Explain how you know a segment is a diameter.

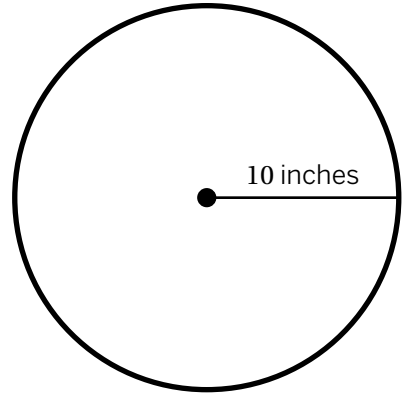


Show What You Know



3.03

What is the circumference of this circle?



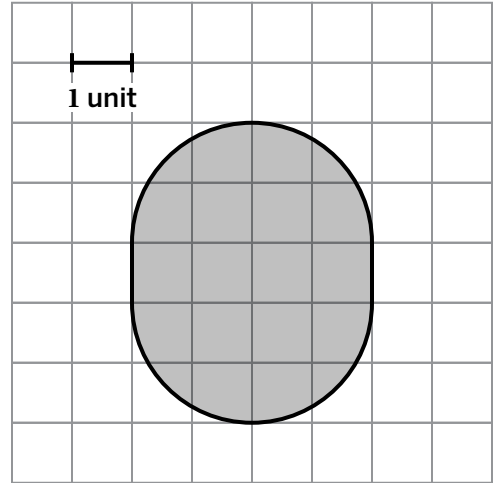
Explain your thinking.

Show What You Know



3.04

What is the approximate area of this shape?



Show What You Know

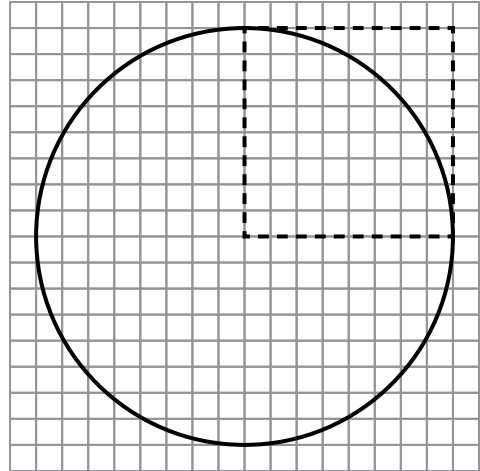


3.05

Here is a circle and one of its radius squares.

- a** About how many radius squares does it take to cover the circle?

- b** Estimate the area of the circle.
Show your thinking.



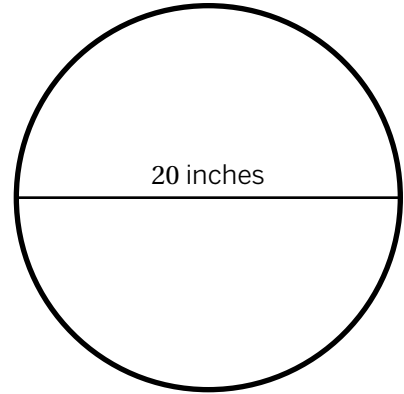
Show What You Know



3.06

What is the exact area of this circle?

Show or explain your thinking.




Show What You Know Lesson 1

Name: _____ Date: _____ Period: _____

Show What You Know 3.01

David created and measured several scaled copies of figure A.



What is the perimeter of a scaled copy that has a top side length of 6.5 units?
65 units

Explain your thinking.
Explanations vary. The table is proportional with a constant of proportionality of 10. $6.5 \cdot 10 = 65$ units.

Top Side Length (units)	Perimeter (units)
2	20
3.12	31.2
8	80
1.5	15

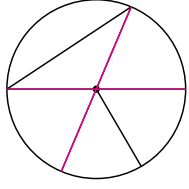
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Show What You Know Lesson 2

Name: _____ Date: _____ Period: _____

Show What You Know 3.02

The diagram shows several line segments and a point. The point is located at the center of the circle.



a Trace all the segments that are diameters.
Response shown on diagram.

b Explain how you know a segment is a diameter.
Responses vary. A segment is a diameter if it goes from one point on a circle to another point on the circle and passes through the center.

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Show What You Know Lesson 3

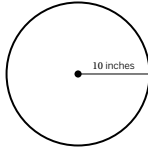
Name: _____ Date: _____ Period: _____

Show What You Know 3.03

What is the circumference of this circle?
Responses vary as students may use π , 3.14, or $\frac{22}{7}$ in their calculations.

- 20 π inches
- 62.8 inches
- $\frac{440}{7}$ inches

Explain your thinking.
Explanations vary. The radius of the circle is 10 inches, so the diameter is twice that value, or 20 inches. To find the circumference, I can multiply the diameter by π .



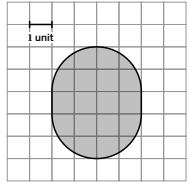
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Show What You Know Lesson 4

Name: _____ Date: _____ Period: _____

Show What You Know 3.04


What is the approximate area of this shape?
Responses between 15 and 18 square units are considered correct.



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Show What You Know Lesson 5

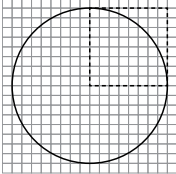
Name: _____ Date: _____ Period: _____

Show What You Know  3.05

Here is a circle and one of its radius squares.

a) About how many radius squares does it take to cover the circle?
Responses vary. About 3 radius squares.


b) Estimate the area of the circle.
 Show your thinking.
Responses and work vary. About 192 square units.
 $8 \cdot 8 = 64$
 $3 \cdot 64 = 192$



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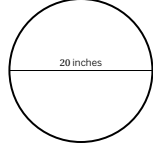
Show What You Know Lesson 6

Name: _____ Date: _____ Period: _____

Show What You Know  3.06

What is the exact area of this circle?
100π square inches

Show or explain your thinking.
Responses vary.
 $r = 20 \div 2 = 10$ inches
 $A = \pi \cdot 10^2 = 100\pi$ square inches



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Unit 4

Assessments and Rubrics

Pre-Unit Check

Unit 4

1. Match each fraction expression to an equivalent percent expression.

Fraction Expression**Percent Expression**

a. $\frac{3}{4}$ of x

..... 25% of x

b. $\frac{1}{4}$ of x

..... 40% of x

c. $\frac{2}{5}$ of x

..... 4% of x

d. $\frac{1}{25}$ of x

..... 75% of x

2. Select *all* the expressions that are equivalent to 5% of 60.

A. $\frac{1}{20}(60)$

B. $\frac{1}{5} \cdot 60$

C. $0.05 \cdot 60$

D. $0.5(60)$

E. $\frac{5}{100} \cdot 60$

3. What is 13% of 200?

Explain your thinking.

4. A new soft drink has 20% less sugar than before. The drink originally had 50 grams of sugar.

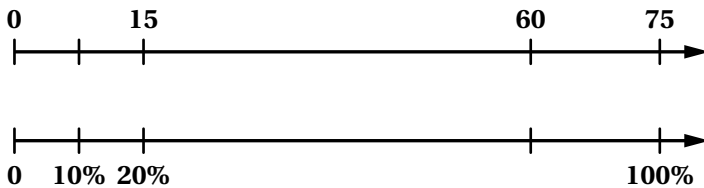
How much sugar was removed?

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

5. Select *all* the expressions that are equivalent to $0.4x$.

- A. $(1 - 0.6)x$
- B. $1 - 0.6x$
- C. $x - 0.6$
- D. $x - 0.6x$
- E. $\frac{40}{100}x$

6. Gabriel created this double number line. Fill in the value at each unlabeled tick mark.



7. Last year, Thiago hosted a spaghetti dinner for the school soccer team. He made 6 boxes of spaghetti to feed 20 people.

This year, 50 people are coming! How many boxes of spaghetti should Thiago make to feed all of his guests?

Sub-Unit Quiz

Unit 4

1. The value of a car decreases over time. This year, Faaria's car is worth \$22,000. If the value of Faaria's car decreases by 8%, what will her car be worth next year?

- A. \$1,760
- B. \$17,600
- C. \$20,240
- D. \$23,760

2. Mayra bought x grams of rice. Anika bought 30% more than Mayra bought.

Select *all* the equations that represent the relationship between the amount of rice that Mayra bought, x , and the amount of rice that Anika bought, y .

- A. $y = 0.7x$
- B. $y = 0.3x$
- C. $y = x + 0.3x$
- D. $y = x - 0.3x$
- E. $y = 1.3x$

3. Last year a phone charger was priced at \$30. This year, the same charger is priced at \$24.

What was the percent decrease?

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

4. In 2023, Anya spent an average of 4 hours a day looking at screens. In 2024, Anya's weekly screen time increased by 250%.

What was Anya's average weekly screen time in 2024?


Explain your thinking.


5. A storekeeper increased the price of hats by 5%.

- a A hat was originally priced at \$15.00. What is the new cost of the hat?
- b Write an equation to calculate the new total cost, c , when the original price of a hat is p dollars.
- c If the price of a hat (after the increase) is \$33.60, what was the original price?

Explain your thinking.

 Standard	MA.7.AR.3.1
Problem(s)	1, 2, 3, 4, 5a, 5b, 5c

Problem 1  Standard: MA.7.AR.3.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice: \$20,240</p>			<p>Incorrect choice.</p> <p>Students who select \$1,760 may have calculated 8% of \$22,000.</p> <p>Students who select \$23,760 may have added 8% to the initial value.</p> <p>Students who select \$17,600 may have calculated 80% of \$22,000.</p>

Problem 2  Standards: MA.7.AR.3.1, MTR.7.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Both correct choices and no incorrect choices.</p> <ul style="list-style-type: none"> • $y = x + 0.3x$ • $y = 1.3x$ 	<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 📌 Standards: MA.7.AR.3.1, MTR.3.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: 20%</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write 25% may have calculated a percent increase from \$24.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write 6 may have subtracted the values directly.</p>	<p>Response shows limited understanding.</p>

Problem 4 📌 Standards: MA.7.AR.3.1, MTR.6.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p>14 hours. <i>Explanations vary. A 250% increase means 350% of the starting amount. $350\% = 3.5$ so I did $3.5 \cdot 4 = 14$, which means the 2024 screen time is 14 hours per week.</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 an incorrect number of hours but shows correct calculation strategies, such as $2.5 \cdot 4 = 10$.</p>	<p>Correct response with incomplete explanation.</p> <p>Incorrect response with explanation that shows partial understanding.</p> <p>E.g., Response indicates that student added the value and percent directly, resulting in a response of 6.5 or 254.</p>	<p>Incorrect response with no explanation.</p>

Problem 5a 📌 Standard: MA.7.AR.3.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: \$15.75</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write \$22.50 may have calculated the price after a 50% increase. Students who write \$14.25 may have calculated a 5% decrease.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write \$0.75 may have calculated 5% of \$15.</p>	<p>Response shows limited understanding.</p>

Problem 5b				Standards: MA.7.AR.3.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct responses:</p> <p>$c = 1.05p$ $c = p + 0.05p$</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write $p = 1.05c$ may have reversed the variables in the context.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write $c = 1.5p$ may have written 5% as 0.5.</p>	<p>Response shows limited understanding.</p> <p>E.g., $c = p + 0.05$ or $c = 5p$</p>	

Problem 5c				Standards: MA.7.AR.3.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response and complete explanation.</p> <p>\$32.00. <i>Explanations vary.</i> I used the equation $c = 1.05p$ and substituted \$33.60 in place of c. Then I divided both sides by 1.05 to get p, the original price of the hat.</p>	<p>Correct response with minor flaws in explanation.</p> <p>E.g., Response includes \$32 but has an incomplete explanation.</p> <p>Incorrect response with logical and complete explanation.</p> <p>E.g., Response includes \$31.92 because the student calculated a 5% decrease from \$33.60.</p>	<p>Correct response with incomplete explanation.</p> <p>Incorrect response with explanation that shows partial understanding.</p> <p>E.g., Response includes \$35.28 because the student substituted the incorrect variable.</p>	<p>Incorrect response with no explanation.</p>	

End-of-Unit Assessment**Unit 4**

1. A car is 160 inches long. A truck is 7% longer than the car. How long is the truck?
- A. 272 inches B. 171.2 inches
C. 11.2 inches D. 167 inches
2. Dalia is painting her room. After painting $\frac{1}{10}$ of her room, Dalia has used $\frac{1}{2}$ of a can of paint. Select *all* of the true statements.
- A. Each can of paint will cover $\frac{1}{20}$ of the Dalia's room.
 B. 3 cans of paint will cover 60% of the Dalia's room.
 C. Dalia's entire room requires 5 cans of paint.
 D. Dalia's entire room requires 20 cans of paint.
 E. Painting $\frac{1}{2}$ of Dalia's room requires 10 cans of paint.
3. Oliver wants to cut a piece of metal to be 30 centimeters long. The piece of metal ends up being 29.4 centimeters long. What is the percent error in this situation?
- A. 1.02% B. 0.6% C. 2% D. 20%
4. A lamp originally costs \$30. Krishna has a 5% off coupon for the lamp. After the coupon, a 5% sales tax is applied. He will pay:
- A. More than \$30. B. Less than \$30. C. Exactly \$30.

Explain your thinking.

5. The population of Renton, WA is about 101,920 people. 10 years ago, the population was about 91,000 people.¹

By what percent did the population increase in the last 10 years?

¹ Source: US Census Bureau

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

- 6.** A store is offering a 20% discount on all items.
- a** Write an equation for the relationship between the discount price of an item, d , and its original price, p .

 - b** The price of a hat after the discount is \$18. What was the original price?
- 7.** The cost of college is expected to increase by 3.5% next year.
- a** The cost to attend Westish College is currently \$18,000 per year. If the cost to attend Westish increases by 3.5%, what would the cost be next year?

 - b** Write an equation to represent the cost of *any* college as it increases by 3.5%. Use t to represent this year's cost and n to represent next year's cost.

 - c** The cost to attend Faber College increased by 3.5% since last year. The new cost is \$23,805. What was the cost last year? Explain or show your thinking.
- 8.** A loan is taken out to cover the cost of a home renovation. The bank offers a simple interest rate of 6.2% per year for a 4-year term. If the loan amount is \$1,200, what is the total amount that must be repaid at the end of 4 years?

Standard	MA.7.AR.3.1	MA.7.AR.3.2	MA.7.AR.4.2	MA.7.AR.4.5
Problem(s)	1, 3, 4, 5, 6a, 6b, 7a, 7b, 7c, 8	2	2	2

Problem 1		Standard: MA.7.AR.3.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice:</p> <p>171.2 inches</p>			<p>Incorrect choice.</p> <p>Students who select <i>272 inches</i> may have calculated a 70% increase instead of a 7% increase.</p> <p>Students who select <i>11.2 inches</i> may have calculated 7% of the car's length instead of a 7% increase.</p> <p>Students who select <i>167 inches</i> may have added $160 + 7$.</p>

Problem 2		Standards: MA.7.AR.3.2, MA.7.AR.4.2, MA.7.AR.4.5	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Both correct choices and no incorrect choices.</p> <ul style="list-style-type: none"> 3 cans of paint will cover 60% of the bedroom. The entire bedroom requires 5 cans of paint. 	<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.7.AR.3.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct choice: 2%</p>			<p>Incorrect choice.</p> <p>Students who select 0.6% may have calculated the actual error in centimeters and not the percent error.</p> <p>Students who select 20% may have correctly calculated $\frac{0.6}{30}$, but did not correctly convert this to a percentage.</p> <p>Students who select 1.02% may have calculated what percentage 30 is of 29.4.</p>	

Problem 4				Standard: MA.7.AR.3.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response and complete explanation. Less than \$30. Explanations vary. After a 5% discount, the lamp costs \$28.50. Then after a 5% tax, the lamp costs about \$29.93.</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 of multistep percentage problems.</p>	<p>Incorrect response with no explanation.</p>	

Problem 5				Standard: MA.7.AR.3.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response: 12%</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write 10.7% may have divided the change in population by the current population instead of the original population.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write 89%, 89.3%, or 112% may have calculated what percent 91,000 is of 101,920, or vice versa.</p>	<p>Response shows limited understanding.</p>	

Problem 6a				Standard: MA.7.AR.3.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response: <i>Responses vary.</i></p> <ul style="list-style-type: none"> • $d = 0.8p$ • $d = p - 0.2p$ • $d = (1 - 0.2)p$ • $d = \frac{4}{5}p$ 	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write $d = 0.2p$ may have found 20% of the original price rather than a 20% decrease.</p> <p>Students who write $p = 0.8d$ may have mixed up the variables.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>	

Problem 6b				Standard: MA.7.AR.3.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response: \$22.50</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write \$14.40 may have solved the problem, "What is the price after a 20% discount on \$18?"</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write \$3.60 may have calculated 20% of \$18.</p>	<p>Response shows limited understanding.</p>	

Problem 7a			Standard: MA.7.AR.3.1
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: \$18,630</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write \$24,300 may have calculated the cost after a 35% increase.</p> <p>Students who write \$630 may have calculated the increase in price, but did not add that to determine the total cost next year.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write \$6,300 may have calculated 35% of \$18,000.</p>	<p>Response shows limited understanding.</p>

Problem 7b			Standards: MA.7.AR.3.1, MTR.7.1
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: <i>Responses vary.</i></p> <ul style="list-style-type: none"> • $n = 1.035t$ • $n = t + 0.035t$ • $n = (1 + 0.035)t$ 	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write $n = 0.035t$ may have written an equation that finds 3.5% of the original cost rather than the cost after a 3.5% increase.</p> <p>Students who write $t = 1.035n$ may have mixed up the variables.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>

Problem 7c				Standards: MA.7.AR.3.1, MTR.3.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response and complete explanation.</p> <p>\$23,000.</p> <p><i>Explanations vary. Since \$23,805 is the amount after an increase, I divided. $\frac{23805}{1.035}$ is \$23,000.</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 \$17,633.33 because the student calculated the cost before a 35% increase.</p>	<p>Correct response with incomplete explanation.</p> <p>Incorrect response with explanation that shows partial understanding.</p> <p>E.g., Response includes \$24,638.18 because the student calculated a 3.5% increase for \$23,805.</p>	<p>Incorrect response with no explanation.</p>	

Problem 8				Standards: MA.7.AR.3.1, MTR.7.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response:</p> <p>\$1297.60</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write \$297.60 may have solved the problem, "How much interest will be paid at the end of 4 years?"</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write \$30,960 may not have written the interest rate as a decimal.</p> <p>Students who write \$29,760 may not have written the interest rate as a decimal or added the interest to the initial amount of the loan.</p>	<p>Response shows limited understanding.</p>	

End-of-Unit Assessment**Unit 4**

1. A pencil is 120 millimeters long. A marker is 9% longer than the pencil. How long is the marker?
- A. 130.8 millimeters B. 10.8 millimeters
C. 228 millimeters D. 129 millimeters
2. Kayleen is mowing a field. After mowing $\frac{1}{8}$ of the field, she used $\frac{1}{2}$ of a gallon of gas. Select *all* of the true statements.
- A. Mowing the entire field requires 4 gallons of gas.
 B. Mowing the entire field requires 16 gallons of gas.
 C. Each gallon of gas will allow Kayleen to mow $\frac{1}{4}$ of the field.
 D. Mowing $\frac{1}{2}$ of the field requires 2 gallons of gas.
 E. 3 gallons of gas will allow Kayleen to mow 50% of the field.
3. The temperature in a room is 20.0°C. A thermometer measures it as 20.8°C. What is the percent error in this situation?
- A. 40% B. 4% C. 1.04% D. 0.8%
4. Na'ilah purchases a rug that costs \$50. A 10% sales tax is applied. After the tax, Na'ilah uses a 10% off coupon. She will pay:
- A. Exactly \$50. B. More than \$50. C. Less than \$50.

Explain your thinking.

5. The population of Bristol, PA is about 53,110 people. Thirty years ago, the population was about 56,500 people.¹

By what percent did the population decrease in the last 30 years?

¹ Source: *US Census Bureau*


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


6. Nicolas has a coupon for a 60% discount at his favorite store.
- a Write an equation for the relationship between the discount price of an item, d , and its original price, p .


 - b The price of a coat after the discount is \$21. What was the original price?
7. The price of new cars and trucks is expected to increase by 2.9% next year.
- a The price of a specific car is \$17,000. If the price of the car increases by 2.9%, what would the price be next year?

 - b Write an equation to represent the price of *any* car as it increases by 2.9%. Use t to represent this year's price and n to represent next year's price.

 - c The price of a truck increased by 2.9% since last year. The new price is \$22,638. What was the price last year? Explain or show your thinking.
8. A loan is taken out to cover the cost of purchasing new furniture. The bank offers a simple interest rate of 5.8% per year for a 3-year term. If the loan amount is \$1,500, what is the total amount that must be repaid at the end of 3 years?

 Standard	MA.7.AR.3.1	MA.7.AR.3.2	MA.7.AR.4.2	MA.7.AR.4.5
Problem(s)	1, 3, 4, 5, 6a, 6b, 7a, 7b, 7c, 8	2	2	2

Problem 1		 Standard: MA.7.AR.3.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice: 130.8 millimeters</p>			<p>Incorrect choice.</p> <p>Students who select 228 <i>mm</i> may have calculated a 90% increase instead of a 9% increase.</p> <p>Students who select 10.8 <i>mm</i> may have calculated 9% of the pencil's length instead of a 9% increase.</p> <p>Students who select 129 <i>mm</i> may have added $120 + 9$.</p>

Problem 2		 Standards: MA.7.AR.3.2, MA.7.AR.4.2, MA.7.AR.4.5	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>All correct choices and no incorrect choices.</p> <ul style="list-style-type: none"> Mowing the entire field requires 4 gallons of gas. Each gallon of gas will allow Kayleen to mow $\frac{1}{4}$ of the field. Mowing $\frac{1}{2}$ of the field requires 2 gallons of gas. 	<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.7.AR.3.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct choice: 4%</p>			<p>Incorrect choice.</p> <p>Students who select 0.8% may have calculated the actual error in °C and not the percent error.</p> <p>Students who select 40% may have correctly calculated $\frac{0.8}{20}$, but did not correctly convert this to a percentage.</p> <p>Students who select 1.04% may have calculated $20.8 \div 20$.</p>	

Problem 4				Standard: MA.7.AR.3.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response and complete explanation. Less than \$50. Explanations vary. After a 10% tax, the rug costs \$55. Then after a 10% coupon, the rug costs \$49.50.</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 [x].</p> <p>Incorrect response with explanation that shows partial understanding of multistep percentage problems.</p>	<p>Incorrect response with no explanation.</p>	

Problem 5				Standard: MA.7.AR.3.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response: 6%</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write 6.4% may have divided the change in population by the current population instead of the original population.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write 94%, 1.06%, or 106% may have calculated what percent 53,110 is of 56,500, or vice versa.</p>	<p>Response shows limited understanding.</p>	

Problem 6a				Standards: MA.7.AR.3.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response: <i>Responses vary.</i></p> <ul style="list-style-type: none"> • $d = 0.4p$ • $d = p - 0.6p$ • $d = (1 - 0.6)p$ • $d = \frac{2}{5}p$ 	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write $d = 0.6p$ may have found 60% of the original price rather than a 60% decrease.</p> <p>Students who write $p = 0.4d$ may have mixed up the variables.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>	

Problem 6b				Standard: MA.7.AR.3.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response: \$52.50</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write \$8.40 may have solved the problem, "What is the price after a 60% discount on \$21?"</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write \$12.60 may have calculated 60% of \$21.</p>	<p>Response shows limited understanding.</p>	

Problem 7a		Standard: MA.7.AR.3.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: \$17,493</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write \$16,507 may have calculated the cost after a 2.9% decrease.</p> <p>Students who write \$493 may have correctly calculated the increase in price, but did not add that to determine the total cost next year.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write \$4,930 may have calculated 29% of \$17,000.</p>	<p>Response shows limited understanding.</p>

Problem 7b		Standards: MA.7.AR.3.1, MTR.7.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: <i>Responses vary.</i></p> <ul style="list-style-type: none"> • $n = 1.029t$ • $n = t + 0.029t$ • $n = (1 + 0.029)t$ 	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write $n = 0.029t$ may have written an equation that finds 2.9% of the original cost rather than the cost after a 2.9% increase.</p> <p>Students who write $t = 1.029n$ may have mixed up the variables.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>

Problem 7c			
Standards: MA.7.AR.3.1, MTR.3.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p>\$22,000.</p> <p><i>Explanations vary. Since \$22,638 is the amount after an increase, I divided.</i></p> $\frac{22638}{1.029} \text{ is } \$22,000.$	<p>Correct response with minor flaws in explanation.</p> <p>Incorrect response with logical and complete explanation.</p> <p>E.g., Response includes \$17,548.84 because the student calculated the cost before a 2.9% increase.</p>	<p>Correct response with incomplete explanation.</p> <p>Incorrect response with explanation that shows partial understanding.</p> <p>E.g., Response includes \$23,294.50 because the student calculated a 2.9% increase for \$22,638.</p>	<p>Incorrect response with no explanation.</p>

Problem 8			
Standards: MA.7.AR.3.1 and MTR.7.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>\$1297.60</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write \$261 may have solved the problem, "How much interest will be paid at the end of 3 years?"</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write \$27,600 may not have written the interest rate as a decimal.</p> <p>Students who write \$26,100 may not have written the interest rate as a decimal or added the interest to the initial amount of the loan.</p>	<p>Response shows limited understanding.</p>

Unit 4

**Show What You
Know PDFs**

Show What You Know



4.01

The number of fish in a pond decreased by 10% this year compared to last year.

Last year, there were 60 fish in the pond.

How many fish are in the pond this year?

Show What You Know



4.02

Jayla's bank account increased by 7% this year.

Write an equation to represent the relationship between the amount that Jayla started with, b , and the amount she has now, c .

Show What You Know

**4.03**

A company's new container holds 40% more laundry soap. If their original container held 53 fluid ounces of soap, how much does the new container hold? Show or explain your thinking.

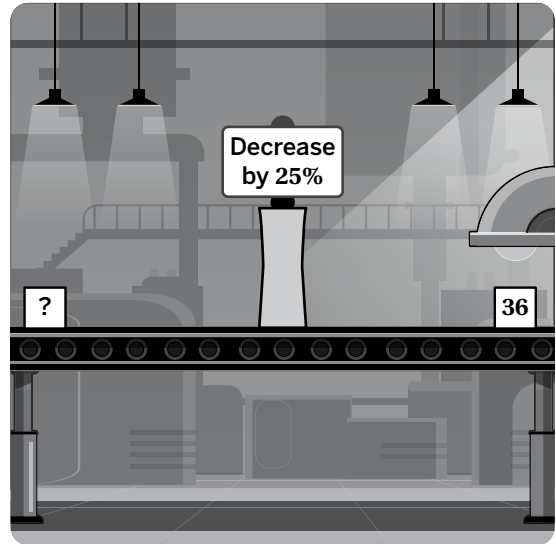
Show What You Know



4.04

A number went into this machine and 36 came out.

What number went in?



Show What You Know



4.05

In 2000, the average price of a gallon of gas was \$1.30. By 2024, the price had increased by about 150%. What was the price in 2024?¹

Show or explain your work.

¹ Source: *US Bureau of Labor and Statistics*

Show What You Know



4.06

A meal's bill is \$30 before tax and tip.

A 7% sales tax is applied, followed by a 20% tip (on the after-tax amount).

What is the total after tax and tip?

Bill:	\$30.00
7% Tax:	\$
Total Before Tip:	\$
20% Tip:	\$
Total After Tip:	\$???.??

Show What You Know



4.08

An egg is labeled as “jumbo egg” if it weighs 2.5 ounces.

Jamya buys a carton of jumbo eggs and finds that one egg weighs 2.4 ounces.

What is the percent error?

Show What You Know**4.09**

It costs \$3.75 to buy $\frac{3}{4}$ of a pound of walnuts.

How many pounds of walnuts can you buy with \$11.25?

Walnuts (lb)	Cost (\$)
$\frac{3}{4}$	3.75
	11.25

Show What You Know**4.10**

Aba and Esteban each make lemonade

Aba

Aba mixes $2\frac{1}{2}$ cups of water with $\frac{1}{3}$ cup of lemon juice.

Esteban

Esteban mixes $1\frac{2}{3}$ cups of water with $\frac{1}{4}$ cup of lemon juice.

Whose lemonade mixture has more lemon juice per cup? Show or explain your thinking.

Show What You Know



4.11

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

How many quarts of ice cream does the restaurant need?

1 gallon = 4 quarts

Show What You Know**4.12**

Use long division to write $\frac{4}{15}$ as a decimal. Determine whether the decimal is a terminating or repeating decimal.

Show What You Know



4.13

Here are some facts about wild tigers.

- a** Write a question that you could figure out using this information and whose answer is not already given.

- b** Answer your question.


In 2010, the number of wild tigers in the world reached an all-time low of 3,200.

Since 2010, the wild tiger population has been growing about 3.6% per year.

Source: World Wildlife Foundation

Show What You Know Lesson 1

Name: _____ Date: _____ Period: _____


Show What You Know  **4.01**

The number of fish in a pond decreased by 10% this year compared to last year.
Last year, there were 60 fish in the pond.
How many fish are in the pond this year?
54 fish

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Show What You Know Lesson 2

Name: _____ Date: _____ Period: _____

Show What You Know  **4.02**


Jayla's bank account increased by 7% this year.
Write an equation to represent the relationship between the amount that Jayla started with, k , and the amount she has now, c .
Responses vary.

- $1k + 0.07k = c$
- $1.07k = c$
- $c = (1 + 0.07)k$


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Show What You Know Lesson 3

Name: _____ Date: _____ Period: _____

Show What You Know  **4.03**

A company's new container holds 40% more laundry soap. If their original container held 53 fluid ounces of soap, how much does the new container hold? Show or explain your thinking.
74.2 fluid ounces. Explanations vary. 53 fluid ounces represents the original 100%. I multiplied 53 by 1.4 to determine how much the new container holds.


Soap (fl. oz) 

% of Soap Old Bottle Holds 

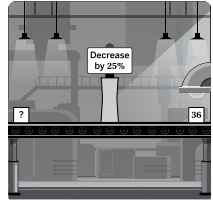
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Show What You Know Lesson 4

Name: _____ Date: _____ Period: _____

Show What You Know  **4.04**


A number went into this machine and 36 came out.
What number went in?
48



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Show What You Know Lesson 5

Name: _____ Date: _____ Period: _____

Show What You Know  **4.05**

In 2000, the average price of a gallon of gas was \$1.30. By 2024, the price had increased by about 150%. What was the price in 2024?
\$3.25


Show or explain your work.
Explanations vary. $1.30 \cdot 2.5 = 3.25$

¹Source: US Bureau of Labor and Statistics

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Show What You Know Lesson 6

Name: _____ Date: _____ Period: _____

Show What You Know  **4.06**


A meal's bill is \$30 before tax and tip.
 A 7% sales tax is applied, followed by a 20% tip (on the after-tax amount).
 What is the total after tax and tip?
\$38.52

Bill:	\$30.00
7% Tax:	\$
Total Before Tip:	\$
20% Tip:	\$
Total After Tip:	\$???.??

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Show What You Know Lesson 7

Name: _____ Date: _____ Period: _____

Show What You Know  **4.07**


1. You deposit \$250 into an account that pays 4% simple interest.

- a. If you leave the money in the account for 4 years, how much interest will your original deposit earn?
\$37.50
- b. How much money will be in your account?
\$287.50

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Show What You Know Lesson 8

Name: _____ Date: _____ Period: _____


Show What You Know  **4.08**

An egg is labeled as "jumbo egg" if it weighs 2.5 ounces.
 Jamya buys a carton of jumbo eggs and finds that one egg weighs 2.4 ounces.
 What is the percent error?
4%

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Show What You Know Lesson 9

Name: _____ Date: _____ Period: _____

Show What You Know  **4.09**


It costs \$3.75 to buy $\frac{3}{4}$ of a pound of walnuts.
How many pounds of walnuts can you buy with \$11.25?

Walnuts (lb)	Cost (\$)
$\frac{3}{4}$	3.75
$2\frac{1}{4}$ (or equivalent)	11.25

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Show What You Know Lesson 10

Name: _____ Date: _____ Period: _____

Show What You Know  **4.10**

Aba and Esteban each make lemonade.

Aba
Aba mixes $2\frac{1}{2}$ cups of water with $\frac{1}{3}$ cup of lemon juice.


Esteban
Esteban mixes $1\frac{1}{2}$ cups of water with $\frac{1}{4}$ cup of lemon juice.

Whose lemonade mixture has more lemon juice per cup? Show or explain your thinking.
Esteban's. Explanations vary. Aba uses $7\frac{1}{2}$ cups of water per 1 cup of lemon juice because $2\frac{1}{2} \div \frac{1}{3} = 7\frac{1}{2}$. Esteban uses 6 cups of water per 1 cup of lemon juice because $1\frac{1}{2} \div \frac{1}{4} = 6$. Esteban's mixture has less water for the same amount of lemon juice.

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Show What You Know Lesson 11

Name: _____ Date: _____ Period: _____

Show What You Know  **4.11**


A restaurant needs 5 gallons of ice cream for dessert one night.
How many quarts of ice cream does the restaurant need?
20 quarts

1 gallon = 4 quarts

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Show What You Know Lesson 12

Name: _____ Date: _____ Period: _____

Show What You Know  **4.12**


Use long division to write $\frac{4}{15}$ as a decimal. Determine whether the decimal is a terminating or repeating decimal.
0.26
Work varies.
0.2666
15 | 4.0000
- 0
40
- 30
100
- 90
100
- 90
100
- 90
10

This is a repeating decimal because the 6 repeats forever.

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Show What You Know Lesson 13

Name: _____ Date: _____ Period: _____

Show What You Know  **4.13**

Here are some facts about wild tigers.

a Write a question that you could figure out using this information and whose answer is not already given.
Responses vary. How many wild tigers were there in the world in 2012?

b Answer your question.
Responses vary. There were about 3,435 wild tigers in 2012.

In 2010, the number of wild tigers in the world reached an all-time low of 3,200.

Since 2010, the wild tiger population has been growing about 3.6% per year.

Source: World Wildlife Foundation

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Unit 5

Assessments and Rubrics

Pre-Unit Check

Unit 5

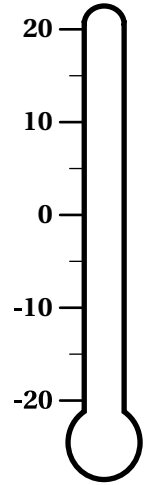
1. On Monday in Minneapolis, Minnesota, it was 0°F outside.

a On Tuesday, it was 15 degrees colder.

What was the temperature on Tuesday?

b Wednesday was 5 degrees warmer than Tuesday.

What was the temperature on Wednesday?



2. Select *all* of the true statements.

A. $-2 < -5$

B. -5 is less than -2.

C. -2 is closer to 0 than 5 is.

D. $-5 > -2$

E. $2 < 5$

3. Here are five numbers.

$\frac{5}{2}$	$-\frac{2}{5}$	-2	5.2	-5
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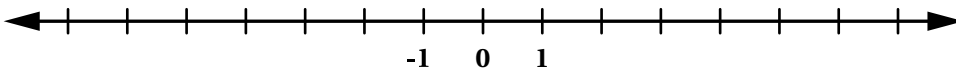
a Order the numbers by value from *least* to *greatest*.

--	--	--	--	--

Least

Greatest

b Place the values on the number line.



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

4. Determine the value of each expression.

Expression	Value
$\frac{11}{4} + \frac{9}{4}$	
$24.14 - 12.16$	
$\frac{5}{8} + \frac{3}{2}$	
$102.82 + 13.43$	

5. **a** If the equation $2 + a = 5$ is true, which other equation(s) must be true?
Select *all* that apply.

- A.** $5 - a = 2$ **B.** $2 - a = 5$ **C.** $a + 2 = 5$
 D. $5 - 2 = a$ **E.** $2 - 5 = a$

b If the equation $\frac{8}{2} = b$ is true, which other equation(s) must be true?
Select *all* that apply.

- A.** $2 \cdot b = 8$ **B.** $\frac{8}{b} = 2$ **C.** $2 \cdot 8 = b$
 D. $\frac{1}{2} \cdot b = 8$ **E.** $8 \cdot \frac{1}{2} = b$

6. Determine the value of the variable that makes each equation true.

- a** $x - 2.6 = 5$ **b** $2.6 \cdot 5 = y$ **c** $\frac{1}{4}z = 8$

Sub-Unit Quiz**Unit 5**

1. Brandon must break a code to find his present. Where should Brandon look?

Look under the $-\frac{19}{8}$ $\frac{17}{9}$ $2.1\bar{6}$ $1\frac{4}{15}$.

A	B	C	D	E
$126.\bar{6}\%$	$1\frac{2}{9}$	$-0.\bar{5}$	$\frac{11}{5}$	$-116.\bar{6}\%$

F	O	R	S	T
$\frac{13}{6}$	$1.\bar{8}$	1.08	-2.375	$1\frac{5}{9}$

- A. BEDS
 B. DESK
 C. SEAT
 D. SOFA
2. Myrta is taking a multiple choice test. Her calculator shows that $\frac{11}{12}$ is equal to 0.91666667, but that isn't an answer choice on the test. What happened?
- A. Myrta's calculator rounded the decimal instead of using bar notation.
 B. Myrta must have entered the wrong information into the calculator.
 C. Myrta's calculator must not be able to display decimals correctly.
 D. There is an error on the test since 0.91666667 is not an answer choice.
3. Evaluate each expression. Show your calculations.

a $(-3)^2 + 4 \times \left(\frac{10}{2} - 3\right) - |-7|$

Sub-Unit Quiz (continued)**Unit 5**

b $\frac{12}{4} + 4^2 - |5 - 9| \times 2$


c $4(-0.12 + 9.36 \div 3) + \frac{16}{2} - 5^2$

4. Circle all of the equivalent values.

A. Equal to $\frac{5}{3}$	1.6	$1.\bar{6}$	$1\frac{2}{5}$	$1\frac{2}{3}$	$166.\bar{6}\%$
B. Equal to 1.83	$1\frac{5}{6}$	1.83	$\frac{11}{6}$	$1\frac{83}{100}$	1.83%
C. Equal to 155.5%	$\frac{14}{9}$	$1\frac{5}{9}$	$1.\bar{5}$	1.5555	$\frac{155}{100}$


5. Cecelia was asked to evaluate $(3 - 7)^2 + |\frac{12}{6} - 8| \div 2$. Her work is shown below. Do you agree with her work? Explain your thinking.

$$\begin{aligned} &(-4)^2 + |2 - 8| \div 2 \\ &= 16 - 6 \div 2 \\ &= 16 - 3 \\ &= 13 \end{aligned}$$

 Standard	MA.7.NSO.1.2	MA.7.NSO.2.1
Problem(s)	1,2,4	3, 5

Problem 1  Standard: MA.7.NSO.1.2			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>D. SOFA</p>			<p>Incorrect choice.</p> <p>Students who select one of the other choices may have difficulty converting between various forms (e.g., decimals, fractions, and percents).</p>

Problem 2  Standard: MA.7.NSO.1.2			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>A. Myrta's calculator rounded the decimal instead of using bar notation.</p>			<p>Incorrect choice.</p> <p>Students who select one of the other choices may not understand how a repeating decimal is rounded when shown on a calculator.</p>

Problem 3a  Standard: MA.7.NSO.2.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>10</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Student follows the order of operations but makes a computational error, or the student makes one error, such as forgetting to square the negative in $(-3)^2$ and gets -9.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Student does not follow the order of operations or makes multiple errors, such as not finding the correct absolute value of -7 and multiplying -3 times 2 instead of using the 2 as an exponent.</p>	<p>Response shows limited understanding.</p>

Problem 3b		Standard: MA.7.NSO.2.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>11</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Student follows the order of operations but makes a computational error.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Student does not follow the order of operations or makes multiple errors, such as not finding the correct absolute value of $5 - 9$ and multiplying 4 times 2 instead of using the 2 as an exponent.</p>	<p>Response shows limited understanding.</p>

Problem 3c		Standard: MA.7.NSO.2.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>-5</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Student follows the order of operations but makes a computational error, or the student makes one error, such as forgetting to divide 9.36 by 3 before adding.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Student does not follow the order of operations or makes multiple errors, such as not multiplying 4 times what is in parentheses and multiplying 5 times 2 instead of using the 2 as an exponent.</p>	<p>Response shows limited understanding.</p>

Problem 4a		Standard: MA.7.NSO.1.2	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>All correct choices and no incorrect choices.</p> <p>$1.\bar{6}$</p> <p>$1\frac{2}{3}$</p> <p>$166.\bar{6}\%$</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 4b				Standard: MA.7.NSO.1.2
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>All correct choices and no incorrect choices.</p> <p>$1\frac{5}{6}$ $\frac{11}{6}$</p>	<p>One correct choice 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 4c				Standard: MA.7.NSO.1.2
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>All correct choices and no incorrect choices.</p> <p>$\frac{14}{9}$ $1\frac{5}{9}$ $1.\bar{5}$</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 5				Standard: MA.7.NSO.1.2
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response and complete explanation.</p> <p><i>Responses vary.</i></p> <p>I do not agree with Cecelia. She forgot to square the negative in $(-4)^2$ and forgot to take the absolute value of -6. The final answer should have been 19, not -19.</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>Incorrect response with no explanation.</p>	

End-of-Unit Assessment

Unit 5

1. Select *all* the values equivalent to $-\frac{15}{9}$.

- A. -1.6
- B. $-1.\overline{6}$
- C. $-166.\overline{6}\%$
- D. $-1\frac{5}{9}$
- E. $-1\frac{2}{3}$

2. What is the value of $12 + 6 - 4\left(\frac{10}{5} - 7\right)^2$?

- A. -82
- B. -46
- C. 58
- D. 118

3. Rewrite each expression as a single power.

Expression	Single Power
$4^5 \cdot 4^8$	
$5^3 \cdot 5^3 \cdot 5^3$	
$(2^6)^7$	
$(10^4)^4$	

4. Write four different expressions that have the same value as $(2^3)^4$ using only numbers, multiplication, and exponents.

.....

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

5. Rewrite each expression as a single power.

Expression	Single Power
$\frac{4^9}{4^3 \cdot 4^4}$	
$\frac{(5^4)^2}{5}$	
$\frac{9^8 \cdot 9^3}{9^4}$	
$\frac{3^4 \cdot 3^4 \cdot 3^4}{3 \cdot 3 \cdot 3}$	

6. Write a number in each box so that each equation is true.

A. $\frac{5^{\square} \cdot 5^{\square}}{5^{\square}} = 5^8$

B. $(-5)^{\square} \cdot (-5)^{\square} = 5^{\square}$

C. $\frac{5^{\square} \cdot 5^{\square}}{(5^2)^{\square}} = 5^4$

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


7. Complete the table below and use it to answer the following questions.


a


Expression	Value
4^3	64
4^2	
4^1	
4^0	


b How could you use this table to convince someone that $4^0 = 1$?

c Would this work with a number other than 4 as the base? Explain your reasoning.

 Standard	MA.7.NSO.1.1	MA.7.NSO.1.2	MA.7.NSO.2.1
Problem(s)	3,4,5,6,7	1	2

Problem 1  Standard: MA.7.NSO.1.2			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>All correct choices and no incorrect choices.</p> <p>$-1.\bar{6}$</p> <p>$-166.\bar{6}\%$</p> <p>$-1\frac{2}{3}$</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 2  Standards: MA.7.NSO.2.1, MTR.5.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>A. -82</p>			<p>Incorrect choice.</p> <p>Students who select one of the other choices may have difficulty following the order of operations.</p>

Problem 3  Standards: MA.7.NSO.1.1, MTR.5.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>All correct answers and no incorrect answers.</p> <p>4^{13}</p> <p>5^9</p> <p>2^{42}</p> <p>10^{16}</p>	<p>Three correct answers.</p>	<p>Two correct answers.</p>	<p>One or no correct answers.</p>

Problem 4 Standards: MA.7.NSO.1.1, MTR.2.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>All correct answers and no incorrect answers.</p> <p><i>Expressions vary. Possible expressions are shown.</i></p> <p style="text-align: center;">2^{12} $(2 \cdot 2 \cdot 2)^4$ 8^4 $8 \cdot 8 \cdot 8 \cdot 8$</p>	Three correct answers.	Two correct answers.	One or no correct answers.

Problem 5 Standards: MA.7.NSO.1.1, MTR.5.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>All correct answers and no incorrect answers.</p> <p>4^2 5^7 9^7 3^9</p>	Three correct answers.	Two correct answers.	One or no correct answers.

Problem 6a Standards: MA.7.NSO.1.1, MTR.5.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Number choices make a true equation.</p> <p><i>Answers vary. Possible exponents are shown.</i></p> <p style="text-align: center;">$\frac{5^6 \cdot 5^4}{5^2} = 5^8$</p>			Number choices make an untrue equation.

Problem 6b Standards: MA.7.NSO.1.1, MTR.5.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
Number choices make a true equation. <i>Answers vary.</i> Possible exponents are shown. $(-5)^2 \cdot (-5)^2 = 5^4$			Number choices make an untrue equation.

Problem 6c Standards: MA.7.NSO.1.1, MTR.5.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
Number choices make a true equation. <i>Answers vary.</i> Possible exponents are shown. $\frac{5^3 \cdot 5^5}{(5^2)^2} = 5^4$			Number choices make an untrue equation.

Problem 7a Standard: MA.7.NSO.1.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
All correct answers and no incorrect answers. 16 4 1	Two correct answers.	One correct answer.	No correct answers.

Problem 7b			
Standards: MA.7.NSO.1.1, MTR.5.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Complete explanation.</p> <p><i>Explanations vary. Each time the exponent decreases by 1, the value is divided by 4. Based on the pattern, we can determine that $4^0 = 1$.</i></p>	<p>Minor flaw in the explanation or missing one part of the explanation.</p> <p>E.g. Students correctly identify that the value is divided by 4 but fail to mention that it occurs each time the exponent decreases by 1.</p>	<p>Incomplete explanation.</p> <p>E.g., Students mention that you just divide by 4.</p>	<p>Incorrect explanation.</p>

Problem 7c			
Standard: MA.7.NSO.1.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p><i>Explanations vary. Yes, it would work for any number. I tested it with a base of 5. The pattern of dividing by the base remained the same. Any nonzero number with an exponent of 0 will be equal to 1.</i></p>	<p>Correct response with minor flaws in the explanation.</p> <p>Incorrect response with logical and complete explanation.</p> <p>E.g. Students answer yes, because they tried it with another base, but guess at the reason why it works.</p>	<p>Correct response with Incomplete explanation.</p> <p>Incorrect response with explanation that shows partial understanding</p> <p>E.g., Students answer yes, but don't provide any examples or explanation other than "because of division."</p>	<p>Incorrect explanation.</p>

End-of-Unit Assessment

Unit 5

1. Select *all* of the values equivalent to $\frac{19}{6}$.

- A. $3\frac{1}{6}$
- B. $3\frac{1}{19}$
- C. $316.\overline{6}\%$
- D. $3.1\overline{6}$
- E. 3.16

2. What is the value of $15 + |3 - 8| - 4^2$?

- A. -6
- B. -3
- C. 4
- D. 10

3. Rewrite each expression as a single power.

Expression	Single Power
$5^6 \cdot 5^3$	
$7^2 \cdot 7^2 \cdot 7^2$	
$(3^5)^2$	
$(6^4)^4$	

4. Write four different expressions that have the same value as $(2^4)^3$ using only numbers, multiplication, and exponents.

.....

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

5. Rewrite each expression as a single power.

Expression	Single Power
$\frac{5^8}{5^3 \cdot 5^2}$	
$\frac{(3^4)^9}{3}$	
$\frac{8^6 \cdot 8^2}{8^5}$	
$\frac{7^5 \cdot 7^5 \cdot 7^5}{7 \cdot 7 \cdot 7}$	

6. Write a number in each box so that each statement is true.

A. $\frac{7^{\square} \cdot 7^{\square}}{7^{\square}} = 7^{\square}$

B. $(-6)^{\square} \cdot (-6)^{\square} = (-6)^{\square}$

C. $\frac{9^{\square} \cdot 9^{\square}}{(9^2)^{\square}} = 9^{\square}$

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


7. Complete the table below and use it to answer the following questions.


a


Expression	Value
6^3	
6^2	
6^1	
6^0	


b How could you use this table to convince someone that $6^0 = 1$?

c Would this work with a number other than 6 as the base? Explain your reasoning.

 Standard	MA.7.NSO.1.1	MA.7.NSO.1.2	MA.7.NSO.2.1
Problem(s)	3,4,5,6,7	1	2

Problem 1  Standard: MA.7.NSO.1.2			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>All correct choices and no incorrect choices.</p> <p>$3\frac{1}{6}$</p> <p>316.$\bar{6}$%</p> <p>3.1$\bar{6}$</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 2  Standard: MA.7.NSO.2.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>C. 4</p>			<p>Incorrect choice.</p> <p>Students who select one of the other choices may have difficulty following the order of operations.</p>

Problem 3  Standard: MA.7.NSO.1.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>All correct answers and no incorrect answers.</p> <p>5^9</p> <p>7^6</p> <p>3^{10}</p> <p>6^{16}</p>	<p>Three correct answers.</p>	<p>Two correct answers.</p>	<p>Incorrect choice.</p> <p>Students who select one of the other choices may have difficulty following the order of operations.</p>

Problem 4 Standard: MA.7.NSO.1.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>All correct answers and no incorrect answers.</p> <p><i>Expressions vary. Possible expressions are shown.</i></p> <p style="text-align: center;"> 2^{12} $(2 \cdot 2 \cdot 2 \cdot 2)^3$ 16^3 $16 \cdot 16 \cdot 16$ </p>	Three correct answers.	Two correct answers.	One or no correct answers.

Problem 5 Standard: MA.7.NSO.1.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>All correct answers and no incorrect answers.</p> <p style="text-align: center;"> 5^3 3^{35} 8^3 7^{12} </p>	Three correct answers.	Two correct answers.	One or no correct answers.

Problem 6a Standard: MA.7.NSO.1.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Number choices make a true equation.</p> <p><i>Exponents vary. Possible exponents are shown.</i></p> <p style="text-align: center;"> $\frac{7^4 \cdot 7^4}{7^2} = 7^6$ </p>			Number choices make an untrue equation.

Problem 6b Standard: MA.7.NSO.1.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
Number choices make a true equation. <i>Exponents vary.</i> Possible exponents are shown. $(-6)^2 \cdot (-6)^3 = 6^5$			Number choices make an untrue equation.

Problem 6c Standard: MA.7.NSO.1.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
Number choices make a true equation. <i>Exponents vary.</i> Possible exponents are shown. $\frac{9^6 \cdot 9^5}{(9^2)^2} = 9^7$			Number choices make an untrue equation.

Problem 7a Standard: MA.7.NSO.1.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
All correct answers and no incorrect answers. 36 6 1	Two correct answers.	One correct answer.	No correct answers.

Problem 7b				Standard: MA.7.NSO.1.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Complete explanation. <i>Explanations vary. Each time the exponent decreases by 1, the value is divided by 6. Based on the pattern, we can determine that $6^0 = 1$.</i></p>	<p>Minor flaw in the explanation or missing one part of the explanation.</p> <p>E.g., Students correctly identify that the value is divided by 6 but fail to mention that it occurs each time the exponent decreases by 1.</p>	<p>Incomplete explanation.</p> <p>E.g., Students mention that you just divide by 6.</p>	<p>Incorrect explanation.</p>	

Problem 7c				Standard: MA.7.NSO.1.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response and complete explanation. <i>Explanations vary. Yes, it would work for any number. I tested it with a base of 9. The pattern of dividing by the base remained the same. Any nonzero number with an exponent of 0 will be equal to 1.</i></p>	<p>Correct response with minor flaws in the explanation.</p> <p>Incorrect response with logical and complete explanation.</p> <p>E.g., Students answer yes, because they tried it with another base, but guess at the reason why it works.</p>	<p>Correct response with Incomplete explanation.</p> <p>Incorrect response with explanation that shows partial understanding</p> <p>E.g., Students answer yes, but don't provide any examples or explanation other than "because of division."</p>	<p>Incorrect explanation.</p>	

Unit 5

**Show What You
Know PDFs**

Show What You Know**5.01**

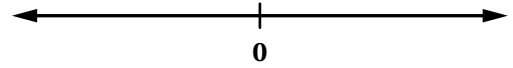
Complete the table.

Fraction	Decimal	Mixed Number	Percent
$\frac{12}{5}$			
			200. <u>64</u> %
		$\frac{51}{400}$	112.75

Show What You Know**5.02**

Determine the value of the variable that makes each equation true. Use the number line if it helps with your thinking.

a $10 + a = 3$

 $a = \dots\dots\dots$ 

b $1.9 + b = -3.2$

 $b = \dots\dots\dots$

c $-\frac{1}{6} + \frac{7}{6} = c$

 $c = \dots\dots\dots$

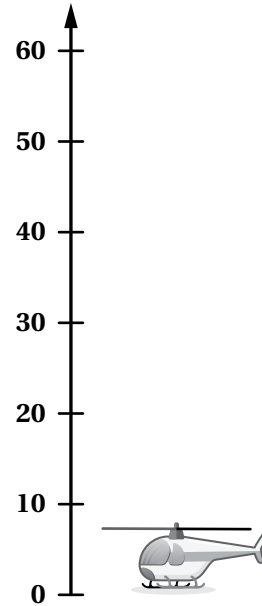
Show What You Know**5.03**

A helicopter just landed. It was traveling downward at a rate of 1.8 meters per second.

Select the equation that represents the helicopter's position 30 seconds ago.

- A. $(-1.8)(-30) = -54$
- B. $(-1.8)(-30) = 54$
- C. $(-1.8)(30) = -54$
- D. $(-1.8)(30) = 54$

Explain your thinking.



Show What You Know**5.04**

Select the *two* expressions that have the same value.

A. $-20 \cdot (-4)$

B. $-\frac{20}{4}$

C. $\frac{-20}{-4}$

D. $\frac{20}{-4}$

E. $-20 \cdot 4$

Show What You Know**5.05**

Seth was asked to evaluate $(6 - 9)^3 + 3 \div 2$. His work is shown below. Do you agree with his work? Explain your thinking.

$$\begin{aligned} &(-3)^3 + 3 \div 2 \\ &-27 + 3 \div 2 \\ &-24 \div 2 \\ &-12 \end{aligned}$$

Show What You Know**5.06**

Select *all* the expressions that are equivalent to 12^6 .

- A. $(12^2)^4$
- B. $3^6 \cdot 4^6$
- C. $12^2 \cdot 12^3$
- D. $(12^3)^2$
- E. $12^3 + 12^3$

Show What You Know



5.07

Here are two expressions. Are these expressions equivalent?

Show or explain your thinking.

Show What You Know**5.08**

Select *all* the expressions that are equivalent to 8^8 .

A. $2^3 \cdot 4^5$

B. $2^8 \cdot 4^8$

C. $\frac{8^{10}}{8^2}$

D. $8^3 + 8^5$

E. $\frac{8^2 \cdot 8^3 \cdot 8^4}{8^1}$

Show What You Know**5.09**

Select *all* the expressions that are equivalent to 10^6 .

A. $10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10$

B. $10^3 + 10^3$

C. 60

D. $10^3 \cdot 10^2$

E. $\frac{10^9}{10^3}$

Show What You Know




5.10

Show or explain why $-4^2 \cdot (-4)^2$ is *not* equal to $(-4)^4$.

Show What You Know Lesson 1

Name: _____ Date: _____ Period: _____

Show What You Know  **5.01**


Complete the table.

Fraction	Decimal	Mixed Number	Percent
$\frac{12}{5}$	2.4	$2\frac{2}{5}$	240%
$\frac{262}{99}$	-2.64	$-2\frac{64}{99}$	-200.64%
$\frac{451}{400}$	1.1275	$1\frac{51}{400}$	112.75%

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Show What You Know Lesson 2

Name: _____ Date: _____ Period: _____

Show What You Know  **5.02**

Determine the value of the variable that makes each equation true. Use the number line if it helps with your thinking.

a $10 + a = 3$

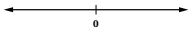
$a = \underline{-7}$

b $1.9 + b = -3.2$

$b = \underline{-5.1}$

c $\frac{1}{6} + \frac{7}{6} = c$


$c = \underline{\frac{8}{6}}$ (or equivalent)



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Show What You Know Lesson 3

Name: _____ Date: _____ Period: _____

Show What You Know  **5.03**

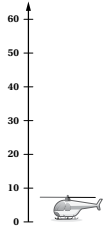
A helicopter just landed. It was traveling downward at a rate of 1.8 meters per second.

Select the equation that represents the helicopter's position 30 seconds ago.

A. $(-1.8)(-30) = -54$
B. $(-1.8)(-30) = 54$
 C. $(-1.8)(30) = -54$
 D. $(-1.8)(30) = 54$

Explain your thinking.


Explanations vary. The helicopter's rate can be represented using a negative number since it was moving downward to land. The time is also represented using a negative number since it refers to a time in the past. Multiplying two negative numbers has a positive value. In this case, this makes sense because 30 seconds ago, the helicopter would have still been in the air, so its position would be represented by a positive number.



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Show What You Know Lesson 4

Name: _____ Date: _____ Period: _____

Show What You Know  **5.04**


Select the two expressions that have the same value.

A. $-20 \cdot (-4)$
 B. $\frac{-20}{-4}$
 C. $\frac{-20}{-4}$
 D. $\frac{20}{-4}$
 E. $-20 \cdot 4$

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Show What You Know Lesson 5

Name: _____ Date: _____ Period: _____

Show What You Know  5.05

Seth was asked to evaluate $(6 - 9)^2 + 3 \div 2$. His work is shown below. Do you agree with his work? Explain your thinking.


$$\begin{aligned} &(-3)^2 + 3 \div 2 \\ &-27 + 3 \div 2 \\ &-24 \div 2 \\ &-12 \end{aligned}$$

Responses vary. No, Seth should have divided 3 by 2 and added the quotient to -27 to get a value of -25.5.

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Show What You Know Lesson 6

Name: _____ Date: _____ Period: _____

Show What You Know  5.06


Select all the expressions that are equivalent to 12^6 .

- A. $(12^2)^3$
- B. $3^6 \cdot 4^6$
- C. $12^3 \cdot 12^3$
- D. $(12^3)^2$
- E. $12^3 + 12^3$

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Show What You Know Lesson 7

Name: _____ Date: _____ Period: _____

Show What You Know  5.07

Here are two expressions. Are these expressions equivalent?

Yes


Show or explain your thinking.

Explanations vary. $3^2 \cdot 3 \cdot 3$ can be rewritten as $3^2 \cdot 3^2$. Since the exponents are the same, I can multiply 3 by 3 to get $(3 \cdot 3)^2$ or 9^2 .

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Show What You Know Lesson 8

Name: _____ Date: _____ Period: _____

Show What You Know  5.08


Select all the expressions that are equivalent to 8^6 .

- A. $2^3 \cdot 4^3$
- B. $2^8 \cdot 4^8$
- C. $\frac{8^{10}}{8^2}$
- D. $8^3 + 8^3$
- E. $\frac{8^5 \cdot 8^4 \cdot 8^4}{8^1}$

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Show What You Know **Lesson 9**

Name: _____ Date: _____ Period: _____

Show What You Know  5.09


Select all the expressions that are equivalent to 10^6 .

- A. $10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10$
- B. $10^3 + 10^3$
- C. 60
- D. $10^3 \cdot 10^2$
- E. $\frac{10^9}{10^3}$

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Show What You Know **Lesson 10**

Name: _____ Date: _____ Period: _____

Show What You Know  5.10

Show or explain why $-4^2 \cdot (-4)^2$ is not equal to $(-4)^4$.

-4^2 is equal to -16, since the negative sign is applied after raising 4 to the power of 2.
 $(-4)^2$ is equal to 16, since the negative sign is inside the parentheses.
 When multiplying these two values together the result is -256.
 Since $(-4)^4$ has an even numbered exponent, the result will be positive, not negative.

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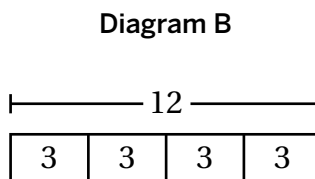
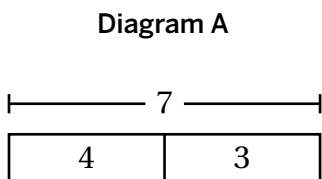
Unit 6

Assessments and Rubrics

Pre-Unit Check

Unit 6

1. Here are Diagrams A and B.



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

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

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

- | | | | |
|----------|--|----------|--|
| a | How many stickers did Vihaan start with? | b | Select <i>all</i> the equations that could be used to determine how many stickers Vihaan started with. |
| | | | <input type="checkbox"/> A. $x + 15 = 60$ |
| | | | <input type="checkbox"/> B. $x = 60 - 15$ |
| | | | <input type="checkbox"/> C. $x = 60 + 15$ |
| | | | <input type="checkbox"/> D. $15x = 60$ |
| | | | <input type="checkbox"/> E. $x = 60 \cdot 15$ |

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

- | | | |
|---|---|--|
| <input type="checkbox"/> A. $-8 = 2x$ | <input type="checkbox"/> B. $-12 = x \cdot (-3)$ | <input type="checkbox"/> C. $-12 = x + x + x$ |
| <input type="checkbox"/> D. $\frac{x}{4} = -1$ | <input type="checkbox"/> E. $x + 4 = -8$ | |

Pre-Unit Check (continued)

Unit 6

4. Solve each equation.

a $p + 7 = 12$

b $90 = -20r$

c $\frac{1}{3}s = 7$

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

A. $12x$

B. $4x + 2$

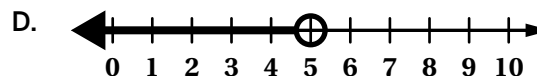
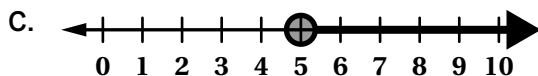
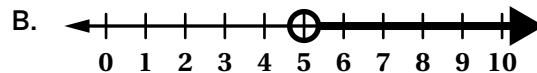
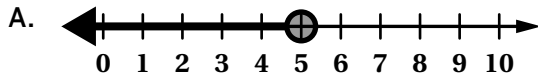
C. $6x$

D. $4x + 8$

Explain your thinking.

6. Ishaan and Arnav are selling boxes of cookies.

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



Explain your thinking.

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

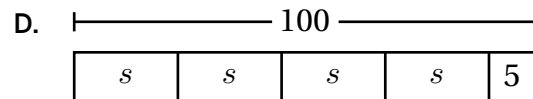
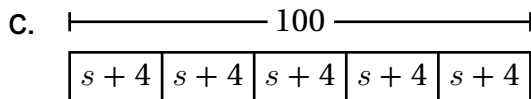
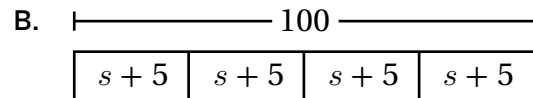
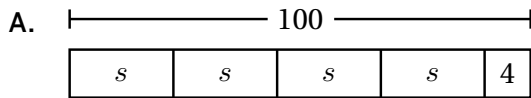
Explain your thinking.

Sub-Unit Quiz**Unit 6**

1. Sothy is baking 5 batches of muffins. Each batch uses 4 teaspoons of sugar for the topping and more sugar for the batter.

Sothy uses 100 teaspoons of sugar in total.

Which tape diagram matches this situation?



2. Select *all* the expressions that are equivalent to $3(8 - 4x)$.

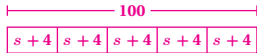
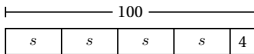
- A. $24 - 4x$
- B. $-12x + 24$
- C. $2(12 - 6x)$
- D. $12x - 24$
- E. $24 - 12x$

3. Solve each equation.

a $3x + 7 = 40$

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

Standard	MA.7.AR.1.1	MA.7.AR.3.3	MA.7.AR.2.2
Problem(s)	2, 4a–b	5a–c	1, 3a–b

Problem 1		Standards: MA.7.AR.2.2, MTR.6.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice:</p> 			<p>Incorrect choice.</p> <p>Students who select</p>  <p>may have known there should be 5 batches, but understood the 4 teaspoons of sugar for the topping as a separate addition instead of included in each batch.</p>

Problem 2		Standards: MA.7.AR.1.1, 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"> • $-12x + 24$ • $2(12 - 6x)$ • $24 - 12x$ 	<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		Standard: MA.7.AR.2.2	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>$x = 11$</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response includes a sign error, such as writing $x = -11$.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write $x = \frac{47}{3}$ may have added 7 to balance both sides of the equation, then divided by 3.</p>	<p>Response shows limited understanding.</p>

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

Problem 4a			Standards: MA.7.AR.1.1, MTR.4.1
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: Kwame subtracted $4 - 2$ first, but the -2 is actually multiplied by $x + 5$, so that needs to happen before the like terms can be combined.</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response only states Kwame should have distributed.</p>	<p>Response shows incomplete understanding with significant errors.</p>	<p>Response shows limited understanding.</p>

Problem 4b			Standard: MA.7.AR.1.1
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: $-2x - 6$ (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>

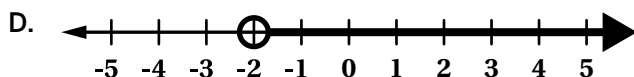
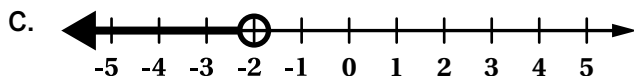
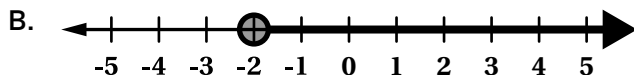
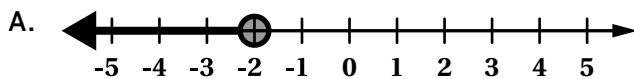
Problem 5a				Standards: MA.7.AR.3.3, MTR.6.1			
4 Meeting		3 Approaching		2 Developing		1 Beginning	
<p>Correct response:</p> <p>x is how much longer and wider Isaiah's new garden is than his old garden.</p>		<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response references an increase in feet, but does not directly relate x to both the length and width of the fence.</p>		<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response references x as part of the fence in general, such as "x is part of the fence measured in feet."</p>		<p>Response shows limited understanding.</p>	

Problem 5b				Standards: MA.7.AR.3.3, MTR.6.1			
4 Meeting		3 Approaching		2 Developing		1 Beginning	
<p>Correct response:</p> <p>$4x + 40$ (or equivalent)</p>		<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write $2(x + 5) + (x + 15)$ may have attempted to combine the lengths and widths but forgot to write 2 for the length.</p>		<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response includes either $4x$ or 40.</p>		<p>Response shows limited understanding.</p> <p>E.g., Response does <i>not</i> include either $4x$ or 40.</p>	

Problem 5c				Standards: MA.7.AR.3.3, MTR.6.1			
4 Meeting		3 Approaching		2 Developing		1 Beginning	
<p>Correct response:</p> <p>2.5 feet</p>		<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response includes $4x + 40 = 50$, but x is solved for incorrectly.</p>		<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Response relates $4x + 40$ to a value other than 50, but x is solved for correctly.</p>		<p>Response shows limited understanding.</p> <p>Students who write 15 may have considered only two of the rectangle's sides and solved $2x + 20 = 50$.</p>	

End-of-Unit Assessment**Unit 6**

1. Which number line shows all of the values of x that make the inequality $3x \leq -6$ true?



2. Parv has a \$50 gift card. He wants to buy n movies. Each movie costs \$3.99.


Which inequality describes how many movies Parv can buy?

- A. $3.99n > 50$
 B. $3.99n \leq 50$
 C. $3.99n \geq 50$
 D. $3.99n < 50$
3. **a** Write $-\frac{1}{4}(-8x + 12)$ in expanded form. **b** Write $36a - 16$ in factored form.

4. Solve each equation.

a $4(x + 2) = 40$ **b** $-2x - 10 = -6$

Standard	MA.7.AR.1.1	MA.7.AR.3.3	MA.7.AR.2.1	MA.7.AR.2.2	MA.7.AR.2.3
Problem(s)	3a–b, 5a–b	6a, 6c	6b–c	4a–b	1, 2

Problem 1			Standard: MA.7.AR.2.3
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice:</p> 			Incorrect choice.

Problem 2			Standards: MA.7.AR.2.3, MTR.6.1
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice:</p> $3.99n \leq 50$			Incorrect choice.

Problem 3a			Standard: MA.7.AR.1.1
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> $2x - 3$ (or equivalent)	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write $2x + 3$ may have multiplied 12 by $\frac{1}{4}$.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write $2x + 12$ may have only multiplied $-\frac{1}{4}$ by $-8x$.</p>	<p>Response shows limited understanding.</p>

Problem 3b			Standard: MA.7.AR.1.1
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>$2(18a - 8)$ or $4(9a - 4)$ (or equivalent)</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write $2(18a + 8)$ may have factored the terms correctly but forgot the subtraction operation.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write $10(26a - 6)$ may have subtracted 10 from each term.</p> <p>Students who write $36(a - 16)$ may have recognized that $36a = 36(a)$.</p>	<p>Response shows limited understanding.</p>

Problem 4a			Standard: MA.7.AR.2.2
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>$x = 8$</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write 12 may have divided both sides by 4 and then added 2 to each side instead of subtracting.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write $\frac{38}{4}$ may have subtracted 2 from each side as their first step or multiplied 4 only by the first term.</p> <p>Students who write 34 may have subtracted 4 from both sides as their first step.</p>	<p>Response shows limited understanding.</p>

Problem 4b			Standard: MA.7.AR.2.2
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: $x = -2$</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write 2 may not have included the negative when writing their solution.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write $\frac{1}{2}$ may have written $-12x = -6$ as their first step.</p> <p>Students who write 8 may have subtracted 10 from both sides as their first step.</p>	<p>Response shows limited understanding.</p>

Problem 5a			Standards: MA.7.AR.1.1. MTR.4.1
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: Diya added all of the terms together instead of adding $6 + 5$ and $-2x + 4x$.</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.7.AR.1.1
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: $11 + 2x$ (or equivalent)</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write $6x - 1$ may have added $-6 + 5$ and $2x + 4x$.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write $8x + 5$ may have subtracted $6 - 2x = 4x$.</p>	<p>Response shows limited understanding.</p>

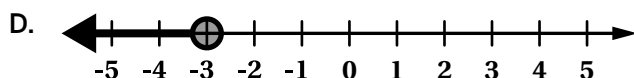
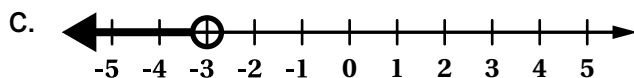
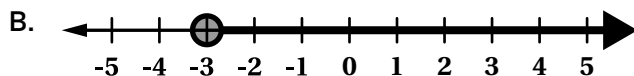
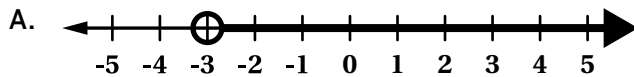
Problem 6a		Standards: MA.7.AR.3.3, MTR.6.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p><i>Yes. Explanations vary. Joel's family would use 7.5 gallons of gas in 15 days, so there would still be $14 - 7.5 = 6.5$ gallons of gas left in the tank.</i></p>	<p>Correct response with minor flaws in explanation.</p> <p>Incorrect response with logical and complete explanation.</p> <p>Students who select <i>No</i> may have answered whether or not Joel's family has used all of their gas or if the warning light is on.</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 6b		Standards: MA.7.AR.2.1, MTR.6.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct responses:</p> <ul style="list-style-type: none"> $0.5d < 14$ (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> <p>Students who write inequalities containing subtraction may have recognized that the gas used each day and the total amount of gas should be subtracted.</p>

Problem 6c		Standards: MA.7.AR.3.3, MA.7.AR.2.1, MTR.7.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p><i>$d < 28$. Explanations vary. The solutions to this inequality represent the number of days that Joel's family can drive.</i></p>	<p>Correct response with minor flaws in explanation.</p> <p>E.g., Response is correct but includes an imprecise explanation (e.g., one that does not reference the warning light coming on).</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>Students who write $d > 28$ may have correctly solved the related equation but did not check the direction of the inequality.</p>	<p>Incomplete response with no explanation.</p>

End-of-Unit Assessment**Unit 6**

1. Which number line shows all of the values of x that make the inequality $2x < -4$ true?



2. Kayla has a goal to hike at least 75 miles. She plans to hike n miles each week for the next 6 weeks.

Which inequality describes the number of miles Kayla should hike each week to meet her goal?

- A. $6n > 75$
 B. $6n \leq 75$
 C. $6n \geq 75$
 D. $6n < 75$
3. **a** Write $-\frac{1}{3}(9x - 15)$ in expanded form. **b** Write $24a - 18$ in factored form.

4. Solve each equation.

a $30 = 2(x + 3)$

b $-4x - 17 = -5$

End-of-Unit Assessment (continued)

Unit 6

5. Here is Caleb's work writing the expression $5 - 3x + 11 - 9x$ with fewer terms.

Caleb

$$5 - 3x + 11 - 9x$$

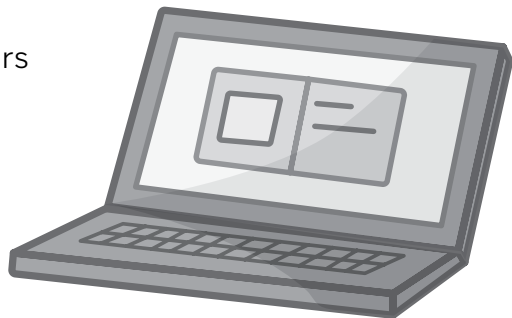
$$16 - 6x$$

$$10x$$

a Describe the mistake that Caleb made.

b Write an expression equivalent to $5 - 3x + 11 - 9x$ that has two terms.

6. When fully charged, Jaylin's computer works for 20 hours. She uses her computer for about 1.5 hours each day.



a If Jaylin's computer starts with a full charge, can she use it for 13 days? Circle one.

Yes

No

Explain how you know.

b Which expression describes the hours of computer charge remaining after d days?

A. $20 - 2d$

B. $1.5 - 20d$

C. $20 - 1.5d$


D. $1.5d - 20$

Write an inequality that represents the number of days Jaylin can use her computer.

c Solve the inequality you wrote.

Explain what the solutions mean in this situation.

Standard	MA.7.AR.1.1	MA.7.AR.3.3	MA.7.AR.2	MA.7.AR.2.2	MA.7.AR.2.3
Problem(s)	3a–b, 5a–b	6a, 6c	6b–c	4a–b	1, 2

Problem 1			Standard: MA.7.AR.2.3
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice:</p> 			Incorrect choice.

Problem 2			Standards: MA.7.AR.2.3, MTR.6.1
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice:</p> $6n \geq 75$			Incorrect choice.

Problem 3a			Standard: MA.7.AR.1.1
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> $-3x + 5$ (or equivalent)	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write $3x - 5$ may have multiplied by $\frac{1}{3}$.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write $-3x - 15$ may have only multiplied $-\frac{1}{3}$ by $9x$.</p>	<p>Response shows limited understanding.</p>

Problem 3b			Standard: MA.7.AR.1.1
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: $2(12a - 9)$ or $6(4a - 3)$ (or equivalent)</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write $2(12a + 9)$ may have factored the terms correctly, but forgot the subtraction operation.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write $10(14a - 8)$ may have subtracted 10 from each term.</p> <p>Students who write $24(a - 18)$ may have recognized that $24a = 24(a)$.</p>	<p>Response shows limited understanding.</p>

Problem 4a			Standard: MA.7.AR.2.2
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: $x = 12$</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write 18 may have divided both sides by 2 and then added 3 to each side instead of subtracting.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write $\frac{27}{2}$ may have subtracted 3 from each side as their first step or multiplied 2 only by the first term.</p> <p>Students who write 25 may have subtracted 2 from both sides as their first step.</p>	<p>Response shows limited understanding.</p>

Problem 4b			Standard: MA.7.AR.2.2
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 3 may not have included the negative sign when writing their solution.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write $\frac{5}{21}$ may have written $-21x = -5$ as their first step.</p> <p>Students who write 5.5 may have subtracted 17 from both sides as their first step.</p>	<p>Response shows limited understanding.</p>

Problem 5a			Standards: MA.7.AR.1.1, MTR.4.1
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: <i>Responses vary.</i></p> <ul style="list-style-type: none"> • Caleb combined $16 - 6x$ to be $10x$, but they can't be combined. • Caleb subtracted $3x - 9x$ instead of $-3x - 9x$. 	<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.7.AR.1.1
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: $16 - 12x$ (or equivalent)</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write $16 + 12x$ may have added like terms without considering their signs.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write $16 - 3x - 9x$ may have correctly added the constants.</p>	<p>Response shows limited understanding.</p>

Problem 6a		Standards: MA.7.AR.3.3, MTR.6.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p><i>Yes. Explanations vary. Jaylin would use the computer for 19.5 hours in 13 days, so there would only be 0.5 hours remaining in the battery.</i></p>	<p>Correct response with minor flaws in explanation.</p> <p>Incorrect response with logical and complete explanation.</p> <p>Students who select <i>No</i> may have answered whether or not the low battery warning would be off after 13 days.</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 6b		Standards: MA.7.AR.1, MTR.6.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct responses:</p> <ul style="list-style-type: none"> $1.5d < 20$ (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> <p>Students who write inequalities containing subtraction may recognize that the battery used each day and the total amount of hours should be subtracted.</p>

Problem 6c		Standards: MA.7.AR.3.3, MA.7.AR.1, MTR.7.1	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p>$d < 13\frac{1}{3}$. Jaylin can use the computer for fewer than 12 days without the low battery warning coming on.</p>	<p>Correct response with minor flaws in explanation.</p> <p>E.g., Response is correct but includes an imprecise explanation (e.g., one that does not reference the warning coming on).</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>Students who write $d > 13\frac{1}{3}$ may have correctly solved the related equation but did not check the direction of the inequality.</p>	<p>Incorrect response with no explanation.</p>

Unit 6

**Show What You
Know PDFs**

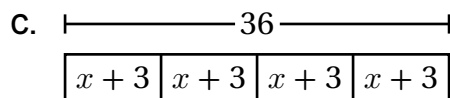
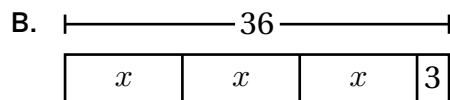
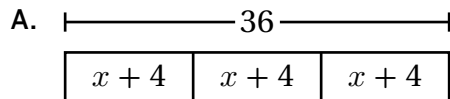
Show What You Know



6.01

Neel and his sister are making gift bags for a party. In each bag, Neel puts 3 pencil erasers, and his sister puts an unknown number of stickers, x . After filling 4 bags, they have put in 36 items.

- a** Which diagram best represents the situation?



- b** What is the value of x ?

Show What You Know

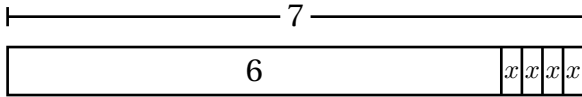


6.02

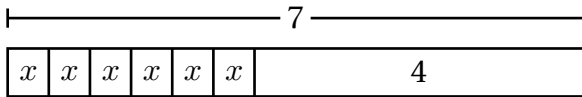
Ariana ran 6 times around her school building. Then she ran 4 miles home. Her phone told her that she ran 7 miles total.

- a** Which equation and tape diagram represent this situation?

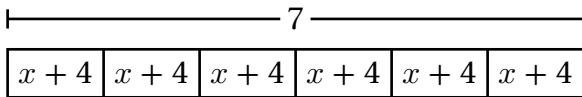
A. $6 + 4x = 7$



B. $6x + 4 = 7$



C. $6(x + 4) = 7$



- b** Determine the value of x .

Show What You Know**6.03**

Deiondre bought a keychain for \$6.75 and 3 shirts for x dollars each. The items cost a total of \$31.50. Complete each section for this situation.

Tape Diagram**Equation****Solution****Meaning of Solution**

Show What You Know

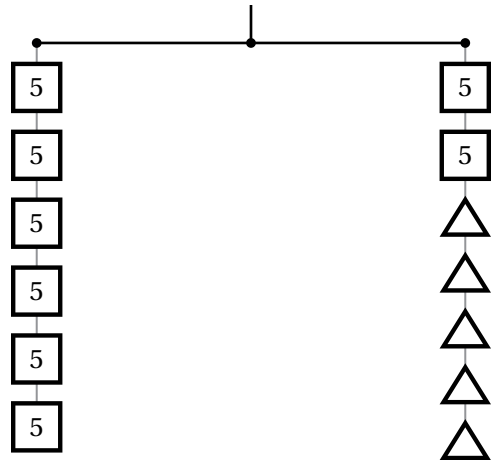


6.04

Here is a new balanced hanger.

What is the weight of a triangle? Draw on the diagram if it helps with your thinking.

Explain your thinking.



Show What You Know**6.05**

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

Show What You Know

**6.06**

Solve each equation. Show your thinking.

a $-3x - 5 = 16$

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

Show What You Know

**6.07**

Solve the equation. Show your thinking.

$$8.88 = 4.44(x - 7)$$

Show What You Know



6.08

Write an equivalent expression to $-5(3 - 2x)$.

Show What You Know**6.09**

Determine whether these expressions are equivalent. Explain your reasoning.

$$\frac{2}{3}(3x - 6) + 4 \text{ and } \frac{1}{2}(12x + 6) - 4x$$

Show What You Know

**6.10**

Write each expression using the fewest number of terms.

a $10x - 2x$

b $18x - (7 + 4x)$

Show What You Know**6.11**

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

- a** One of them made an error. Who was it?
- b** What was the error?

Saanvi

$$5(x - 1) = 45$$

$$x - 1 = 9$$

Ichiro

$$5(x - 1) = 45$$

$$5x - 1 = 45$$

Show What You Know



6.12

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

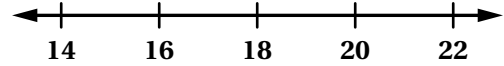
a Write and solve an equation to represent this situation.

b How much time does Neo descent take?

Show What You Know**6.13**

To work at an amusement park, employees must be at least 16 years old.

- a** Make a graph on the number line to represent the possible ages of employees at this park.



- b** Write an inequality to represent this situation.

Show What You Know



6.14

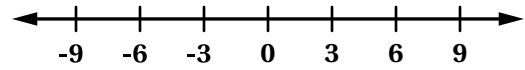
Solve the inequality $19 \geq 2x$. Explain your thinking.

Show What You Know




6.15

Graph the solutions to $-12 > -2x$.



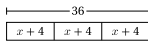
Show What You Know Lesson 1

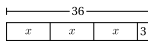
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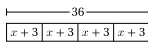
Show What You Know  **6.01**

Neel and his sister are making gift bags for a party. In each bag, Neel puts 3 pencil erasers, and his sister puts an unknown number of stickers, x . After filling 4 bags, they have put in 36 items.

a Which diagram best represents the situation?

A. 

B. 


C. 

b What is the value of x ?
 $x = 6$

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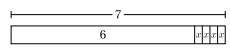
Show What You Know Lesson 2

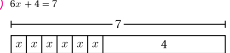
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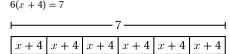
Show What You Know  **6.02**

Ariana ran 6 times around her school building. Then she ran 4 miles home. Her phone told her that she ran 7 miles total.

a Which equation and tape diagram represent this situation?

A. $6 + 4x = 7$


B. $6x + 4 = 7$



C. $6(x + 4) = 7$


b Determine the value of x .
 $x = 0.5$ (or equivalent)

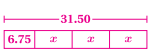
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Show What You Know Lesson 3

Name: _____ Date: _____ Period: _____

Show What You Know  **6.03**


Deiondre bought a keychain for \$6.75 and 3 shirts for x dollars each. The items cost a total of \$31.50. Complete each section for this situation.

Tape Diagram	Equation
	$6.75 + 3x = 31.50$
Solution	Meaning of Solution
$x = 8.25$	The shirts cost \$8.25 each.

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Show What You Know Lesson 4

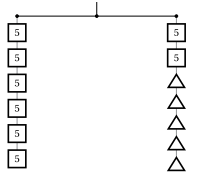
Name: _____ Date: _____ Period: _____

Show What You Know  **6.04**

Here is a new balanced hanger.

What is the weight of a triangle? Draw on the diagram if it helps with your thinking.
4 pounds


Explain your thinking.
Explanations vary. I crossed off 2 squares on the left and 2 squares on the right. I was left with 4 squares (20) to 5 triangles. I divided 20 by 5 and got 4.



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Show What You Know **Lesson 9**

Name: _____ Date: _____ Period: _____

Show What You Know  **6.09**


Determine whether these expressions are equivalent. Explain your reasoning.
 $\frac{2}{3}(3x - 6) + 4$ and $\frac{1}{2}(12x + 6) - 4x$

Solution: Explanations vary. No, these are not equivalent because the first expression simplifies to $2x$ and the second expression simplifies to $2x + 3$.

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Show What You Know **Lesson 10**

Name: _____ Date: _____ Period: _____

Show What You Know  **6.10**


Write each expression using the fewest number of terms.

a $10x - 2x = 8x$ b $18x - (7 + 4x) = 14x - 7$

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Show What You Know **Lesson 11**

Name: _____ Date: _____ Period: _____

Show What You Know  **6.11**

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

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

b What was the error?
Ichiro didn't expand correctly. He only multiplied 5 to the first term in the parentheses.

Saanvi

$$5(x - 1) = 45$$

$$x - 1 = 9$$

Ichiro


$$5(x - 1) = 45$$

$$5x - 1 = 45$$

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Show What You Know **Lesson 12**

Name: _____ Date: _____ Period: _____

Show What You Know  **6.12**

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


a Write and solve an equation to represent this situation.
 $453 - 50x = 146$
 $-50x = -307$
 $x = 6.14$

b How much time does Neo descent take?
6.14 minutes

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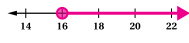
Show What You Know **Lesson 13**

Name: _____ Date: _____ Period: _____

Show What You Know  **6.13**

To work at an amusement park, employees must be at least 16 years old.

a Make a graph on the number line to represent the possible ages of employees at this park.




b Write an inequality to represent this situation.

$x \geq 16$ or $16 \leq x$

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Show What You Know **Lesson 14**

Name: _____ Date: _____ Period: _____

Show What You Know  **6.14**


Solve the inequality $19 \geq 2x$. Explain your thinking.

$9.5 \geq x$ (or equivalent). *Explanations vary.* First, I found the boundary point, which is $x = 9.5$ because that is the solution to the equation $19 = 2x$. The solution to the inequality is $9.5 \geq x$ because 9.5 is the greatest value that makes the inequality true.

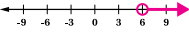
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Show What You Know **Lesson 15**

Name: _____ Date: _____ Period: _____

Show What You Know  **6.15**


Graph the solutions to $-12 > -2x$.



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Show What You Know **Lesson 16**

Name: _____ Date: _____ Period: _____

Show What You Know  **6.16**

Wey Wey is trying to figure out how many movies she can download to her hard drive. Each movie is 8 gigabytes. The hard drive is supposed to hold 500 gigabytes of data.

Wey Wey wrote the inequality $8x \geq 500$ and solved it to find the solution $x \geq 62.5$.

a Describe the mistake that Wey Wey made.

Wey Wey should have used the less-than-or-equal-to symbol.

b Fix Wey Wey's inequality.

$8x \leq 500$

c What would you tell Wey Wey if she asked: How many movies can I download?

I would tell Wey Wey that she can download 62 movies or fewer.

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Unit 7

Assessments and Rubrics

Pre-Unit Check

Unit 7

1. Evaluate the algebraic expression for the given values.

$$2a^2 - 3b$$

a $a = 2$ and $b = 4$

b $a = 5$ and $b = -3$

2. When asked to find the area of the triangle shown below,

Tabitha did the following work.

$$A = \frac{1}{2}bh$$

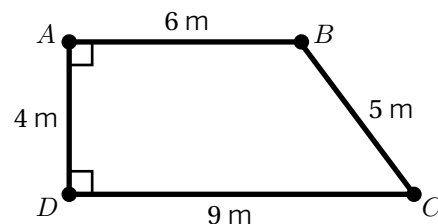
$$A = \frac{1}{2}(14)(8)$$

$$A = 64 \text{ cm}^2$$

Do you agree with Tabitha's work? Explain your thinking. If you disagree with her answer, show how you would find the area of the triangle.

3. What is the area of this figure?

Explain or show your strategy.

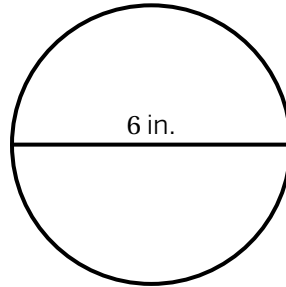


Pre-Unit Check (continued)

Unit 7

4. Use the circle to answer the questions.

- a Calculate the circumference of the circle. Use 3.14 for π .



- b Calculate the area of the circle. Use 3.14 for π .

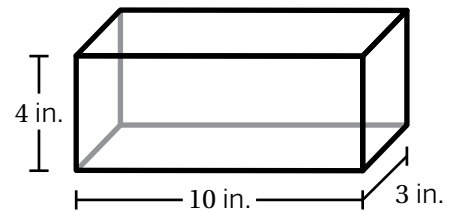
5. Consider volume and surface area.

- a What are some things you know about volume and surface area?

- b What are some things you still wonder about volume and surface area?

6. Here is a rectangular prism.

- a How many 1-by-1-by-1-inch cubes fit inside of this rectangular prism?



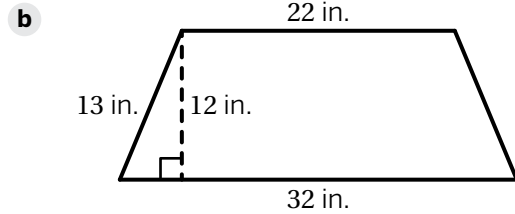
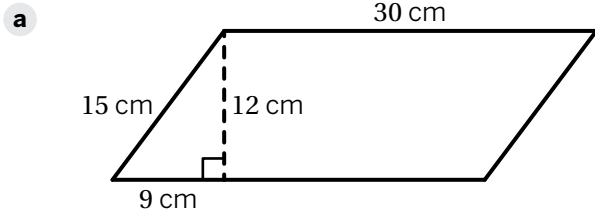
- b How many square inches of paper would you need to cover the entire prism?

Show or explain your thinking.

Sub-Unit Quiz

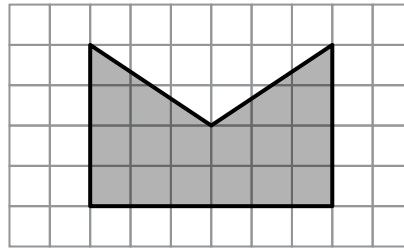
Unit 7

1. Determine the area of each figure.

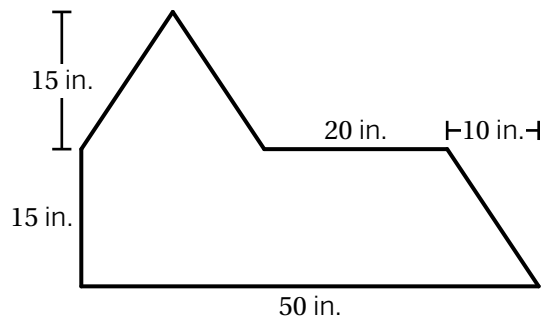


2. Determine the area of this polygon.

Each square has an area of 1 unit.



3. Determine the area of the polygon.

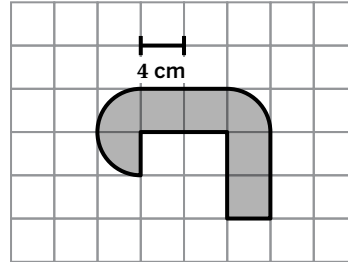


Sub-Unit Quiz (continued)

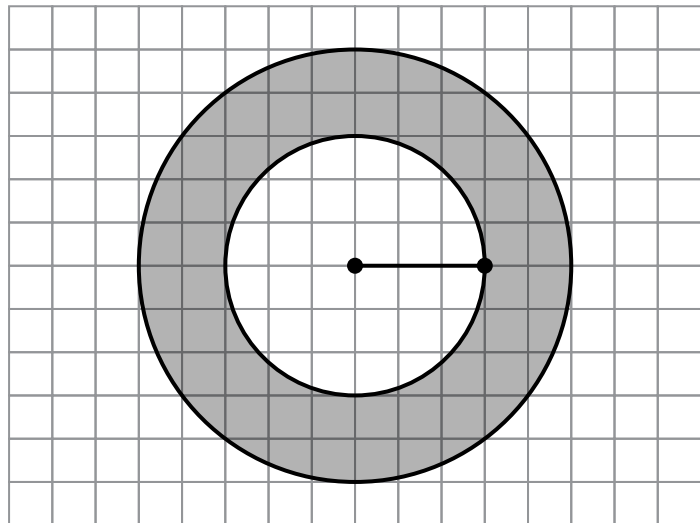
Unit 7

4. Determine the area of the composite figure.

(Use $\pi = 3.14$)



5. Determine the exact area of the shaded region. Each square has an area of 1 unit.



6. The circumference of a circle is 24π cm. What is the area of the circle, in terms of π ? Show or explain your thinking.

Standard	MA.7.GR.1.1	MA.7.GR.1.2	MA.7.GR.1.3	MA.7.GR.1.4
Problem(s)	1a-, 1b	2, 3, 4	5, 6	4, 5

Problem 1a				Standard: MA.7.1.GR.1.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response:</p> <p>$A = 360 \text{ cm}^2$</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Student makes a small computation error or does not include the correct label.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Student uses the slant height instead of the true height or uses 39 as the base.</p>	<p>Response shows limited understanding.</p> <p>E.g., Student finds the perimeter instead of the area.</p>	

Problem 1b				Standards: MA.7.1.GR.1.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response:</p> <p>$A = 324 \text{ in}^2$</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Student makes a small computation error or does not include the correct label.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Student uses the slant height instead of the true height or forgets to add the bases.</p>	<p>Response shows limited understanding.</p> <p>E.g., Student finds the perimeter instead of the area.</p>	

Problem 2				Standard: MA.7.1.GR.1.2
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response:</p> <p>$A = 18 \text{ square units}$</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Student makes minor errors in counting or labeling.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Student missed the partial squares.</p>	<p>Response shows limited understanding.</p> <p>E.g., Student finds the perimeter instead of the area.</p>	

Problem 3			
Standards: MA.7.1.GR.1.2			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>$A = 825 \text{ in}^2$</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Student makes minor computation errors or does not include the correct label.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Student forgets to include part of the area or forgets to take half of the triangular sections.</p>	<p>Response shows limited understanding.</p> <p>E.g., Student finds the perimeter instead of the area or finds the area of a single rectangle.</p>

Problem 4			
Standards: MA.7.1.GR.1.2, MA.7.1.GR.1.4			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>$A = 101.68 \text{ cm}^2$</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Student makes minor computation errors or does not include the correct label.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Student forgets to include the quarter circles or does not use the area formula correctly.</p>	<p>Response shows limited understanding.</p> <p>E.g., Student finds the perimeter instead of the area or finds the area of a single square.</p>

Problem 5			
Standards: MA.7.1.GR.1.3, MA.7.1.GR.1.4			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>$A = 16\pi \text{ square units}$</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Student makes minor computation errors or does not include the correct label.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Student added the areas instead of subtracting them.</p>	<p>Response shows limited understanding.</p> <p>E.g., Student does not use the correct formula to find the area of the circles.</p>

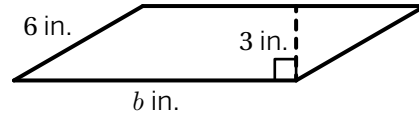
Problem 6		Standards: MA.7.1.GR.1.3, MA.7.1.GR.1.4	
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>Responses vary.</p> <p>First, I need to find the radius of the circle using the circumference.</p> $C = \pi d$ $24\pi = \pi d$ $\frac{24\pi}{\pi} = \frac{\pi d}{\pi}$ $24 = d$ <p>The diameter is equal to $2r$, so $24 = 2r$ or $r = 12$.</p> $A = \pi r^2$ $A = \pi(12^2)$ $A = 144\pi \text{ cm}^2$	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Student makes minor computation errors, does not include the correct label, or does not show/explain one of the steps.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Student uses the diameter instead of the radius in the area formula.</p>	<p>Response shows limited understanding.</p> <p>E.g., Student uses the value of the circumference as the radius.</p>

End-of-Unit Assessment

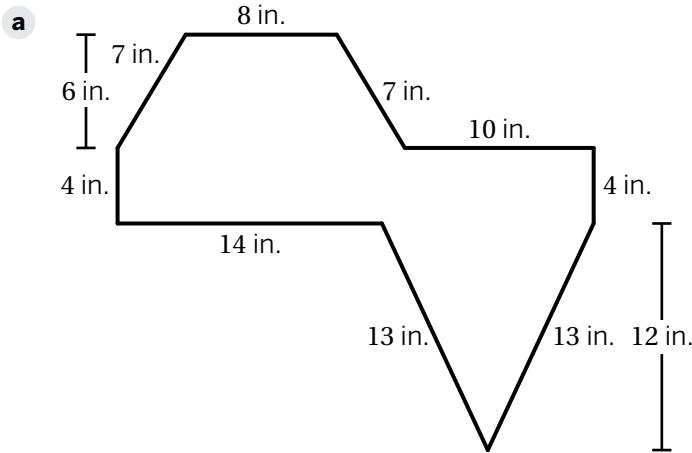
Unit 7

1. What is the length of the base for the given height Area: 24 square inches of this parallelogram?

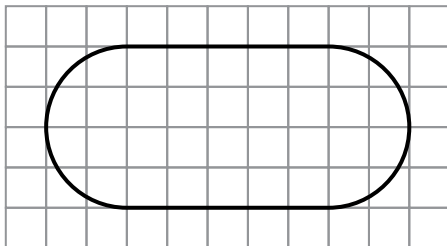
- A. 4 inches
- B. 6 inches
- C. 8 inches
- D. 12 inches



2. Calculate the area of the composite figures below.

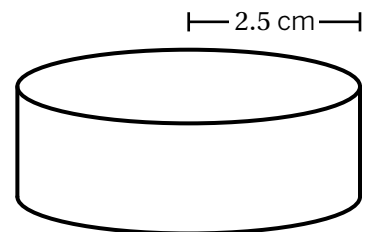


b Each square has an area of 1 unit. (Use $\pi = 3.14$)



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

- 3.** A circular fountain in a park has a diameter of 10 meters. The park manager wants to install a decorative tile border around the fountain's edge.
- a** What is the circumference of the fountain? (Use $\pi = 3.14$.)
 - b** If the manager also wants to cover the entire base of the fountain with blue tiles, what is the area of the base of the fountain?
- 4.** A juice company packages its drinks in cylindrical cans. Each can has a diameter of 8 cm and a height of 12 cm.
- a** Find the volume of one juice can. (Use $\pi = 3.14$.)
 - b** If the factory produces 500 cans in one day, what is the total volume of juice produced?
- 5.** A cylinder has a radius of 2.5 centimeters. Its volume is 37.5π cubic centimeters. What is the height of the cylinder?



End-of-Unit Assessment (continued)

Unit 7

6. Your neighbor owns a rain barrel with a radius of 14 inches and a height of 39 inches. He paints the entire outside and top of the barrel a different color. How much paint did your neighbor use to cover these areas? (Use $\pi = 3.14$.)

Standard	MA.7.GR.1.1	MA.7.GR.1.2	MA.7.GR.1.3	MA.7.GR.1.4	MA.7.GR.2.2	MA.7.GR.2.3
Problem(s)	1	2a	3a	2b, 3b	6	4a, 4b, 5

Problem 1				Standard: MA.7.GR.1.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response:</p> <p>C. 8 inches</p>			<p>Incorrect choice.</p> <p>Students who select one of the other choices may have difficulty identifying the height in a parallelogram.</p>	

Problem 2a				Standard: MA.7.GR.1.2
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response:</p> <p>A = 222 in²</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Student finds the area of each polygon, but forgets to add them together, or makes a computational error.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Student uses the incorrect formulas or substitutes the wrong values into the formulas.</p>	<p>Response shows limited understanding.</p> <p>E.g., Student makes little or no attempt at using area formulas to solve the problem.</p>	

Problem 2b				Standard: MA.7.GR.1.4
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response:</p> <p>A = 32.56 square units</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Student makes a minor computation error or forgets to square the units.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Student calculates the area of the rectangle and two half circle, but forgets to add the other.</p>	<p>Response shows limited understanding.</p> <p>E.g., Student does not use area formulas or the correct calculations.</p>	

Problem 3a			Standard: MA.7.GR.1.3
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>$C = 31.4$ meters</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Student makes a computation error or unnecessarily rounds.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Student calculates the circumference using the radius instead of the diameter.</p>	<p>Response shows limited understanding.</p> <p>E.g., Student finds the area instead of the circumference.</p>

Problem 3b			Standard: MA.7.GR.1.4
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>$A = 78.5$ square meters</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Student makes a computation error or unnecessarily rounds.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Student calculates the area using the diameter instead of the radius.</p>	<p>Response shows limited understanding.</p> <p>E.g., Student finds the circumference instead of the area.</p>

Problem 4a			Standard: MA.7.GR.2.3
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>$V = 602.88$ cm³</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Student makes a computation error or unnecessarily rounds.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Student calculates the area using the diameter instead of the radius.</p>	<p>Response shows limited understanding.</p> <p>E.g., Student does not use the volume formula.</p>

Problem 4b				Standard: MA.7.GR.2.3
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response:</p> <p>$V = 301,440 \text{ cm}^3$</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Student uses their incorrect answer from 4a, but correctly multiplies it by 500.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Student multiplies the correct answer by 24 hours for one day.</p>	<p>Response shows limited understanding.</p> <p>E.g., Student adds 500 to their answer from 4a.</p>	

Problem 5				Standard: MA.7.GR.2.3
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response:</p> <p>$h = 6 \text{ cm}$</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Student makes a computation error or labels the answer with cm^3.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Student sets up the problem correctly but multiplies instead of divides or has several computation errors.</p>	<p>Response shows limited understanding.</p> <p>E.g., Student does not understand how to manipulate the volume formula to solve for height or substitutes the numbers into the formula incorrectly.</p>	

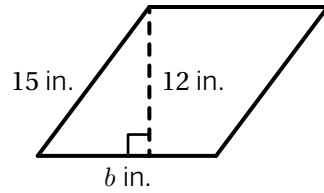
Problem 6				Standard: MA.7.GR.2.2
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response:</p> <p>$SA = 4,044.32 \text{ in}^2$</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Student makes a computation error or fails to use the proper label.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Student uses the volume formula instead of the surface area formula or adds an extra surface area for the bottom of the barrel.</p>	<p>Response shows limited understanding.</p> <p>E.g., Student does not use a formula and just adds the numbers.</p>	

End-of-Unit Assessment

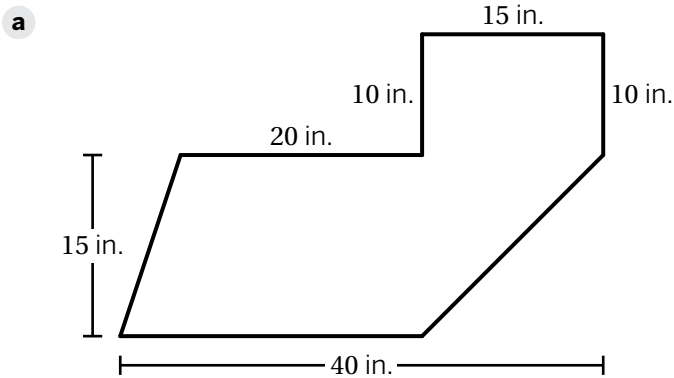
Unit 7

1. What is the length of the base for the given height
Area: 108 square inches of this parallelogram?

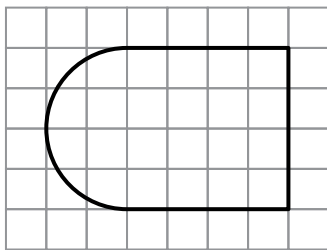
- A. 7.2 inches
- B. 8 inches
- C. 9 inches
- D. 15 inches



2. Calculate the area of the composite figures below.



b Each square has an area of 1 unit. (Use $\pi = 3.14$.)



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

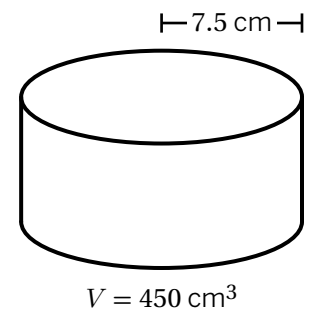
3. A gardener plans to create a circular flower bed with a diameter of 12 meters in a public park. She will place a stone border around the edge of the flower bed.

- a What is the circumference of the flower bed? (Use $\pi = 3.14$.)
- b If the gardener also wants to cover the entire base of the flower bed with mulch, what is the area of the base of the flower bed?

4. A candlemaker produces candles using cylindrical molds. Each mold has a diameter of 10 cm and a height of 15 cm.

- a Find the volume of one candle. (Use $\pi = 3.14$.)
- b If the candlemaker produces 400 candles in one day, what is the total volume of wax used?

5. A cylinder has a radius of 7.5 centimeters. Its volume is 450π cubic centimeters. What is the height of the cylinder?



End-of-Unit Assessment (continued)

Unit 7

6. Your hometown is repainting a cylindrical water tower to match the high school colors. The water tower has a radius of 12 feet and a height of 42 feet. How much paint is needed to cover the top and the entire sides? (Use $\pi = 3.14$.)

Standard	MA.7.GR.1.1	MA.7.GR.1.2	MA.7.GR.1.3	MA.7.GR.1.4	MA.7.GR.2.2	MA.7.GR.2.3
Problem(s)	1	2a	3a	2b, 3b	6	4a, 4b, 5

Problem 1			Standard: 7.G.A.2
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>C. 9 inches</p>			<p>Incorrect choice.</p> <p>Students who select one of the other choices may have difficulty identifying the height in a parallelogram.</p>

Problem 2a			Standard: MA.7.GR.1.2
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>A = 600 in²</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Student finds the area of each polygon, but forgets to add them together, or makes a computational error.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Student uses the incorrect formulas or substitutes the wrong values into the formulas.</p>	<p>Response shows limited understanding.</p> <p>E.g., Student makes little or no attempt at using area formulas to solve the problem.</p>

Problem 2b			Standard: MA.7.GR.1.4
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>A = 22.28 units²</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Student makes a minor computation error or forgets to square the units.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Student calculates the area of the square and one half circle but forgets to add the other.</p>	<p>Response shows limited understanding.</p> <p>E.g., Student does not use area formulas or the correct calculations.</p>

Problem 3a				Standard: MA.7.GR.1.3
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response:</p> <p>$C = 37.68$ meters</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Student makes a computational error or unnecessarily rounds.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Student calculates the circumference using the radius instead of the diameter.</p>	<p>Response shows limited understanding.</p> <p>E.g., Student finds the area instead of the circumference.</p>	

Problem 3b				Standard: MA.7.GR.1.3
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response:</p> <p>$A = 113.04$ square meters</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Student makes a computation error or unnecessarily rounds.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Student calculates the area using the diameter instead of the radius.</p>	<p>Response shows limited understanding.</p> <p>E.g., Student finds the circumference instead of the area.</p>	

Problem 4a				Standard: MA.7.GR.2.3
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response:</p> <p>$V = 1,177.5$ cm³</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Student makes a computation error or unnecessarily rounds.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Student calculates the area using the diameter instead of the radius.</p>	<p>Response shows limited understanding.</p> <p>E.g., Student does not use the volume formula.</p>	

Problem 4b				Standard: MA.7.GR.2.3
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response:</p> <p>$V = 471,000 \text{ cm}^3$</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Student uses their incorrect answer from 4a, but correctly multiplies it by 400.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Student multiplies the correct answer by 24 hours for one day.</p>	<p>Response shows limited understanding.</p> <p>E.g., Student adds 400 to their answer from 4a.</p>	

Problem 5				Standard: MA.7.GR.2.3
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response:</p> <p>$h = 8 \text{ cm}$</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Student makes a computation error or labels the answer with cm^3.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Student sets up the problem correctly but multiplies instead of divides or has several computation errors.</p>	<p>Response shows limited understanding.</p> <p>E.g., Student does not understand how to manipulate the volume formula to solve for height or substitutes the numbers into the formula incorrectly.</p>	

Problem 6				Standard: MA.7.GR.2.2
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response:</p> <p>$SA = 3,617.28 \text{ in}^3$</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Student makes a computation error or fails to use the proper label.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>E.g., Student uses the volume formula instead of the surface area formula or adds an extra surface area for the bottom of the barrel.</p>	<p>Response shows limited understanding.</p> <p>E.g., Student does not use a formula and just adds the numbers.</p>	

Unit 7

**Show What You
Know PDFs**

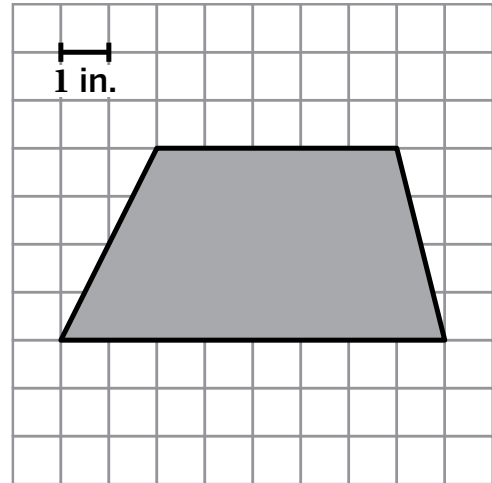
Show What You Know



7.01

What is the area of this polygon?

Draw on the image if it helps with your thinking.



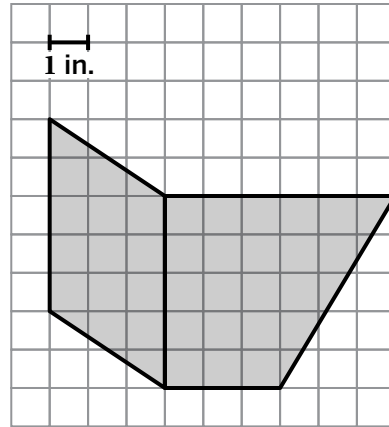
Show What You Know



7.02

What is the area of this polygon?

Show or explain your thinking.

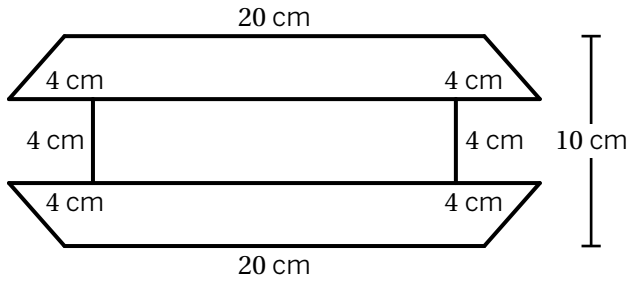


Show What You Know



7.03

Find the area of the composite figure below.



Sketch a way to decompose the figure to help show your thinking.

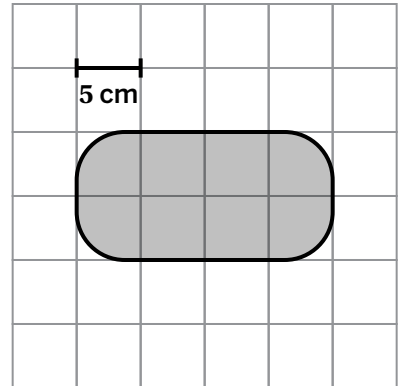
Explain your thinking.

Show What You Know



7.04

Determine the area of this shape.



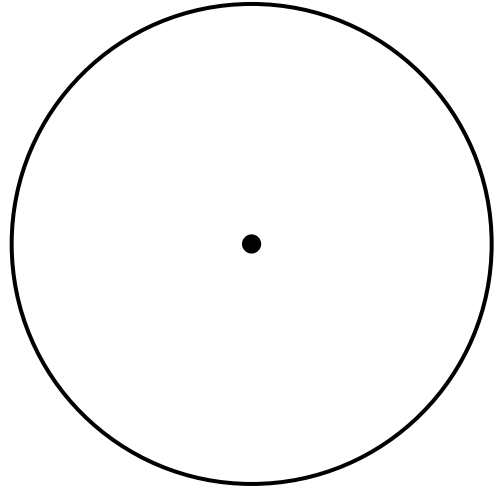
Show What You Know



7.05

The circumference of this circle is 60 feet.

What is the circle's area? Show or explain your thinking.



Show What You Know

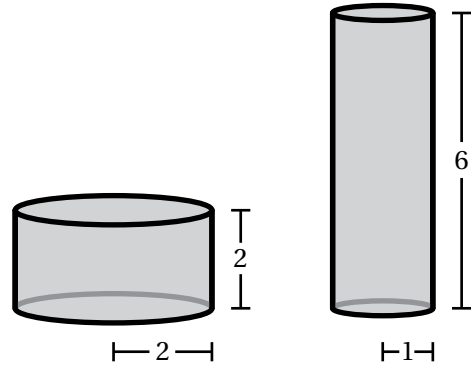


7.06

Which cylinder has the greater volume?

- A. Short cylinder
- B. Tall cylinder
- C. They have the same volume.

Explain your thinking.



Show What You Know

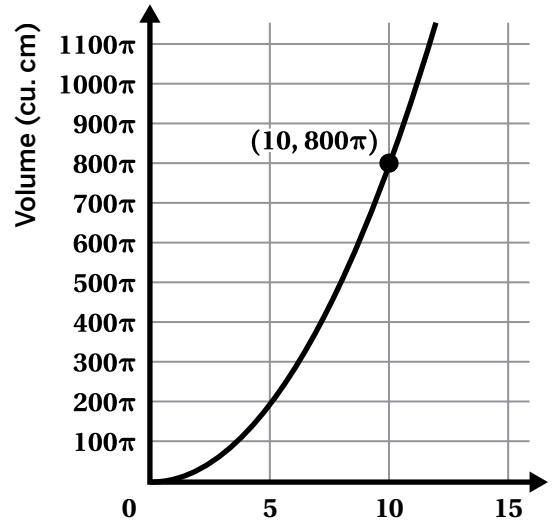


7.07

Which of the following best describes this graph?

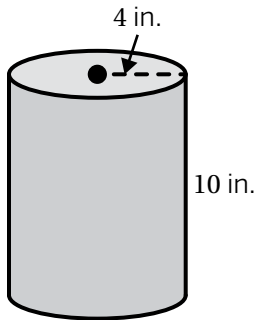
- A. Heights and volumes of cylinders with an 8 cm radius
- B. Heights and volumes of cylinders with a 4 cm radius
- C. Radii and volumes of cylinders with an 8 cm height
- D. Radii and volumes of cylinders with a 4 cm height

Explain your thinking.



Show What You Know**7.08**


Calculate the exact and approximate surface area of the cylinder below. Use 3.14 for π .



Explain your thinking.

Show What You Know Lesson 1

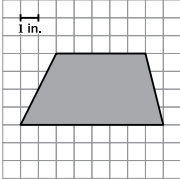
Name: _____ Date: _____ Period: _____

Show What You Know  **7.01**

What is the area of this polygon?

Draw on the image if it helps with your thinking.


26 square inches



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Show What You Know Lesson 2

Name: _____ Date: _____ Period: _____

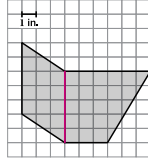
Show What You Know  **7.02**

What is the area of this polygon?

Show or explain your thinking.

37.5 square inches


Explanations may vary. I divided the figure into a parallelogram and a trapezoid. The parallelogram had a base of 5 inches and a height of 3 inches. The trapezoid had bases of 6 inches and 3 inches and a height of 5 inches. The parallelogram has an area of $A = 5 \times 3 = 15$ square inches. The trapezoid has an area of $A = \frac{(6+3)}{2} \times 5 = 22.5$ square inches. $15 + 22.5 = 37.5$ square inches.



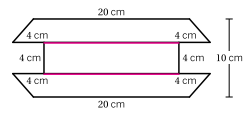
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Show What You Know Lesson 3

Name: _____ Date: _____ Period: _____

Show What You Know  **7.03**

Find the area of the composite figure below.



Sketch a way to decompose the figure to help show your thinking.

224 sq. cm. Responses vary. Sample response shown on figure.


Explain your thinking.

Explanations vary. I divided the figure into a rectangle with a length of 20 cm and a width of 4 cm. The other parts of the figure are two congruent trapezoids with bases 20 cm and 4 cm and a height of 3 cm. The area of the rectangle is $A = (20)(4) = 80$ sq. cm. The area of each trapezoid is $A = \frac{1}{2}(3)(20 + 4) = 72$ sq. cm. The total area of the figure is $2(72) + 80 = 224$ sq. cm.

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Show What You Know Lesson 4

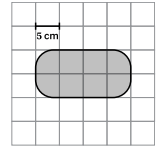
Name: _____ Date: _____ Period: _____

Show What You Know  **7.04**

Determine the area of this shape.

Responses vary as students may use π , 3.14, or $\frac{22}{7}$ in their calculations.

- $25\pi + 100$ square centimeters
- $\frac{3750}{7}$ square centimeters
- 178.5 square centimeters



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Show What You Know Lesson 5

Name: _____ Date: _____ Period: _____

Show What You Know 7.05

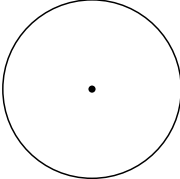
The circumference of this circle is 60 feet.

What is the circle's area? Show or explain your thinking.

Responses vary as students may use π , 3.14, or $\frac{22}{7}$ in their calculations.

- $\frac{900}{\pi}$ (or equivalent) square feet
- 286.62 square feet
- $\frac{900}{11}$ square feet

Explanations vary. I can divide 60 by 2π to get the radius of the circle. Then, I can square the radius and multiply by π to get the area: $(\frac{60}{2\pi})^2 \cdot \pi$



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Show What You Know Lesson 6

Name: _____ Date: _____ Period: _____

Show What You Know 7.06

Which cylinder has the greater volume?

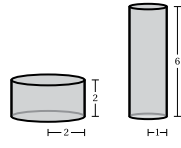
A. Short cylinder

B. Tall cylinder

C. They have the same volume.

Explain your thinking.

Explanations vary. The volume of the short cylinder is $V = \pi \cdot (2)^2 \cdot 2 = 8\pi$. The volume of the tall cylinder is $V = \pi \cdot (1)^2 \cdot 6 = 6\pi$. So the short cylinder has the greater volume.



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Show What You Know Lesson 7

Name: _____ Date: _____ Period: _____

Show What You Know 7.07

Which of the following best describes this graph?

A. Heights and volumes of cylinders with an 8 cm radius

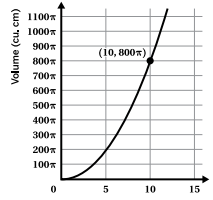
B. Heights and volumes of cylinders with a 4 cm radius

C. Radii and volumes of cylinders with an 8 cm height

D. Radii and volumes of cylinders with a 4 cm height

Explain your thinking.

Explanations vary. The relationship between height and volume is linear, and this graph is not linear, so I knew it had to show the relationship between radius and volume. I noticed that the point $(10, 800\pi)$ was on the curve. That could represent a cylinder that has a radius of 10 and a height of 8, so I concluded that the graph was all cylinders with a height of 8 centimeters.



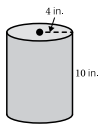
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Show What You Know Lesson 8

Name: _____ Date: _____ Period: _____

Show What You Know 7.08

Calculate the exact and approximate surface area of the cylinder below. Use 3.14 for π .



Explain your thinking.

Exactly 160π square inches or approximately 502.4 square inches. I used the formula $S.A. = 2\pi r h + 2\pi r^2 = 2\pi(4)(10) + 2\pi(4)^2 = 112\pi \approx 351.9$ sq.in.

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Unit 8

Assessments and Rubrics

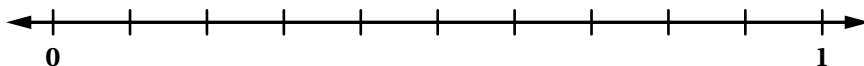
Pre-Unit Check

Unit 8

1. You look at the weather forecast and it says 10% chance of rain today.

Would you take an umbrella? Explain your thinking.

2. Plot and label each number on the number line: 0.75 , $\frac{1}{4}$, 0.2 , 0.5 , $\frac{8}{10}$.



3. Complete the table so that each row has an equivalent fraction, decimal, and percent.

Fraction	Decimal	Percent
$\frac{7}{10}$	0.7	
	0.75	75%
$\frac{3}{5}$		
$\frac{3}{8}$		37.5%

4. Nikhil surveyed 20 students at his middle school. 13 of them had at least one sibling.

- a What percent of the students surveyed have at least one sibling?
- b There are 300 students at Nikhil's middle school. If the rest of the school is consistent with these results, about how many students would have at least one sibling?

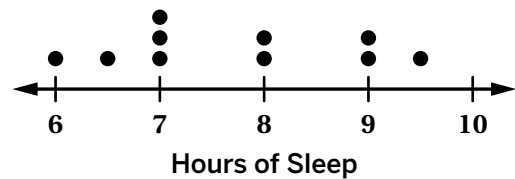
Explain your thinking.

Pre-Unit Check (continued)

Unit 8

5. **a** What are some things you know about mean and median?
- b** What are some things you know about IQR (interquartile range)?
- c** What are some things you still wonder about mean, median, or IQR?

6. Eva is curious how much students at her school sleep. She asked 10 students how many hours they slept last night and recorded their answers in a dot plot.



- a** How many students slept for 8 or more hours last night?
- b** Calculate the mean number of hours that all 10 students slept.
- c** Do you think the mean you calculated is similar to the mean of all the students in Eva's school? Explain your reasoning.

7. There are 11 dancers in a performance. Their ages (in years) are:

5.5, 6, 6, 6.5, 7, 7.5, 8, 8, 8.5, 9, 9

- a** What is the median age of these dancers?
- b** Determine the first quartile, median, and third quartile of the dancers' ages. Label them on the box plot.
- c** What is the interquartile range (IQR) of the dancers' ages?

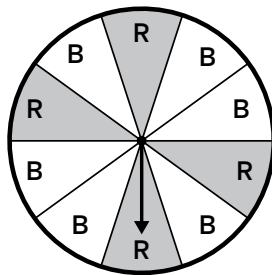


Sub-Unit Quiz

Unit 8

1. Which event is possible, but unlikely?
- A. Flipping one fair coin that lands with heads facing up.
 - B. Opening a 300-page book to exactly page 143.
 - C. Rolling a seven on a standard number cube.
 - D. Getting wet if you stand in the rain without an umbrella.
2. Select *all* of the following events that have a probability of occurring 40% of the time.

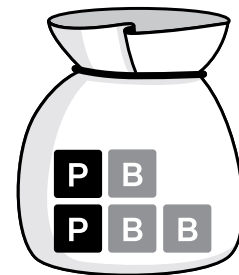
A. Land on R in one spin.



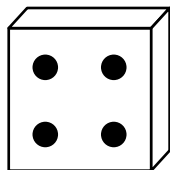
B. Both coins land heads up.



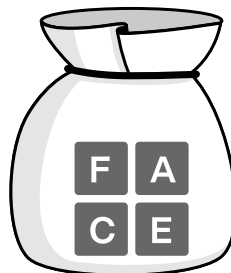
C. Select a "P" from this bag.



D. Roll a 4 in one roll.

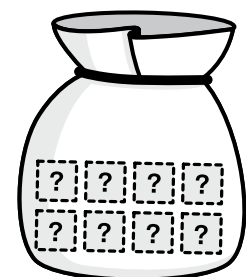


E. Select an "E" from this bag.



3. Esi does an experiment where she picks a block out of a bag without looking 50 times, putting it back each time. She picks a green block 32 times.

- a. Out of 200 picks, how many times do you predict Esi will pick a green block?
- b. If the bag has 8 blocks, how many are likely to be green?



Explain your reasoning.

Sub-Unit Quiz (continued)

Unit 8

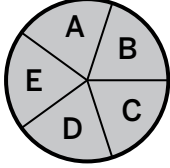
4. The Spin N' Dine Restaurant has a special deal. You can either spin to select one appetizer at random for \$5 or one entree for \$10.

- a** Terrence's favorite appetizer is cheese sticks. What is the probability he will get this appetizer on his spin?

- b** Jenny likes cheese pizza and barbeque ribs. What is the probability she will get one of these appetizers on her spin?

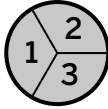
Appetizers

A: Chicken wings
 B: Onion dip
 C: Cheese sticks
 D: Crab cakes
 E: Fried pickles



Entrees

1: Cheese pizza
 2: Barbecue ribs
 3: Meatloaf

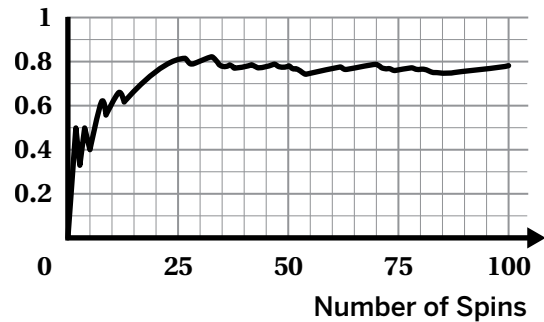


5. Vihaan and Neena use a spinner to decide who has to do the dishes each night. They make a graph of the relative frequency of Vihaan doing the dishes.

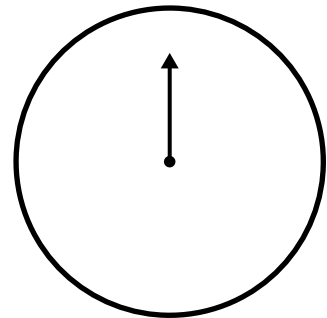
- a** Is this spinner fair?

Explain your thinking. Use evidence to support your claim.

Relative Frequency of Vihaan Doing the Dishes



- b** Describe or sketch what you think their spinner could look like.



Standard	MA.7.DP.2.1	MA.7.DP.2.2	MA.7.DP.2.3	MA.7.DP.2.4	MA.7.NSO.2.2
Problem(s)	1, 4a	2	4b	3a, 3b, 5a	5b

Problem 1			Standard: MA.7.DP.2.1
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct choice:</p> <p>Opening a 300-page book to exactly page 143</p>			<p>Incorrect choice.</p>

Problem 2			Standards: MA.7.DP.2.2, MTR.6.1
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Both correct choices and no incorrect choices.</p> <ul style="list-style-type: none"> Land on R in one spin. Select a "P" from this bag. 	<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.7.DP.2.4
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>Responses between 125 and 128 are considered correct.</p>	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write answers of 120 or 140 may have rounded 32 to 30 or 35.</p>	<p>Response shows limited understanding.</p>

Problem 3b				Standard: MA.7.DP.2.4
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response and complete explanation.</p> <p>5 blocks. <i>Explanations vary. 32 green blocks out of 50 is 64% of the blocks. 64% of 8 blocks is 5.12, which is closest to 5 green blocks.</i></p>	<p>Correct response with minor flaws in explanation.</p> <p>Incorrect response with logical and complete explanation.</p> <p>E.g., Students who write 6 with a complete explanation where they explain that they rounded up.</p>	<p>Correct response with incomplete explanation.</p> <p>Incorrect response with explanation that shows partial understanding.</p> <p>E.g., Students who write “6 because more than half of the blocks are green.”</p>	<p>Incorrect response with no explanation or incorrect explanation.</p>	

Problem 4a				Standard: MA.7.DP.2.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response:</p> <p>$\frac{1}{5}$</p>	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write 5 may not understand how to express probability as a fraction.</p>	<p>Response shows limited understanding.</p>	

Problem 4b				Standard: MA.7.DP.2.3
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response:</p> <p>$\frac{2}{3}$</p>	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write $\frac{1}{3}$ may not understand how to find the number of successful outcomes.</p>	<p>Response shows limited understanding.</p>	

Problem 5a			
Standards: MA.7.DP.2.4, MTR.7.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p><i>No. Explanations vary. If the spinner were fair, then the relative frequency should get close to 0.5 as you spin it more and more times. Looking at the graph, the relative frequency gets closer to 0.75 or 0.8.</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 “No, because Vihaan and Neena should be equal.”</p>	<p>Correct response with incomplete explanation.</p> <p>Incorrect response with explanation that shows partial understanding.</p>	<p>Incorrect response with no explanation or incorrect explanation.</p>

Problem 5b			
Standards: MA.7.DP.2.4, MA.7.NSO.2.2, MTR.7.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p><i>Responses vary.</i></p> <ul style="list-style-type: none"> • The spinner would have 4 sections with 3 of them labeled for Vihaan, so the probability of him doing the dishes would be $\frac{3}{4}$. • The spinner would have 10 sections with 8 of them labeled for Vihaan, so the probability of him doing the dishes would be 0.8. 	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write 0.5 may have attempted to represent a fair spinner.</p>	<p>Response shows limited understanding.</p>

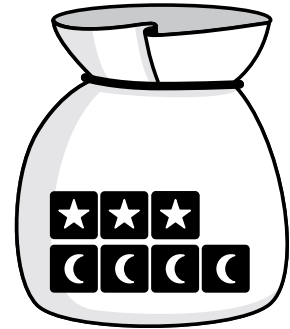
End-of-Unit Assessment

Unit 8

1. You pick a block out of this bag without looking.

What is the probability of picking a star?

- A. $\frac{1}{3}$ B. $\frac{3}{4}$ C. $\frac{3}{7}$ D. $\frac{4}{7}$



2. Adriana is curious: do more customers go to fast-food restaurants or to other restaurants?

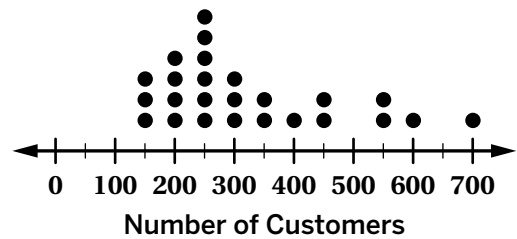
She went to a random sample of 50 restaurants (25 fast-food and 25 other).

At each restaurant, Adriana recorded the number of customers the restaurant had that day.

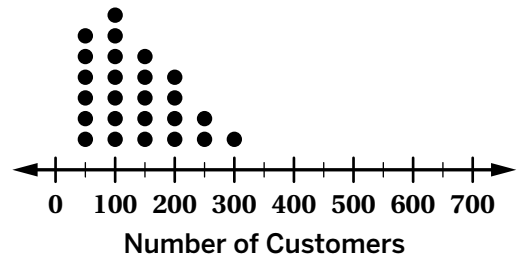
Based on the data, select *all* of the true statements.

- A. Fast-food restaurants tend to get more customers than other restaurants.
- B. Other restaurants tend to get more customers than fast-food restaurants.
- C. Fast-food restaurants have a more consistent number of customers than other restaurants.
- D. Other restaurants have a more consistent number of customers than fast-food restaurants.
- E. All fast-food restaurants have more customers than other restaurants.

Fast-Food Restaurants



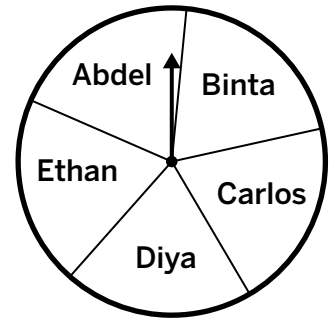
Other Restaurants



End-of-Unit Assessment (continued)

Unit 8

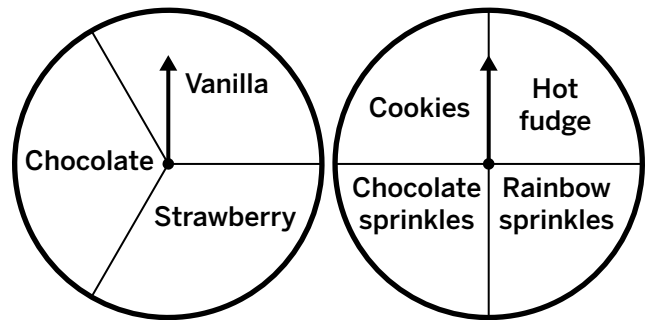
3. Five friends share an apartment. Each week, they use this spinner with 5 equal sections to determine who will mop the floor.



Estimate the number of times Abdel will be chosen to mop in a year (about 52 weeks).

Explain your thinking.

4. The Spin N' Dine Restaurant sells ice cream for dessert. You can spin to either select a flavor of ice cream at random OR one topping at random.



- a What is the probability of getting chocolate ice cream on your spin?
- b What is the probability of NOT getting Hot fudge as a topping on your spin?

5. Rudra thinks school should have a longer lunch period and wants to know if others agree. They survey a random sample of 20 students and find that 12 of them agree.

- a What is the population for Rudra question?
- b If the school has 250 students, about how many do you predict would agree?
- c The next day, Rudra surveys another 20 random students and finds that 8 of them are in favor. Does this make you more or less confident in your prediction?

Explain your thinking.

Standard	MA.7.DP.1.1	MA.7.DP.1.2	MA.7.DP.1.3	MA.7.DP.2.2	MA.7.DP.2.3	MA.7.DP.2.4
Problem(s)	6a	2, 6b	5a, 5b, 5c	1	4a, 4b	3

Problem 1				Standard: MA.7.DP.2.2
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct choice:</p> <p>$\frac{3}{7}$</p>			<p>Incorrect choice.</p> <p>Students who select $\frac{1}{3}$ may have recognized that they are picking one of three stars.</p> <p>Students who select $\frac{3}{4}$ may have compared the number of stars to the number of moons.</p>	

Problem 2				Standards: MA.7.DP.1.2, MTR.6.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Both correct choices and no incorrect choices.</p> <ul style="list-style-type: none"> Fast-food restaurants tend to get more customers than other restaurants. Other restaurants have a more consistent number of customers than fast-food restaurants. 	<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			
Standards: MA.7.DP.2.4, MTR.4.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p>10 or 11 are considered correct. Explanations vary. The probability of the spinner landing on Abdel is $\frac{1}{5}$. That means the best estimate for how many spins out of 52 will land on Abdel is $\frac{1}{5}$ of 52, or 10.4, which rounds to 10.</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>Incorrect response with no explanation.</p>

Problem 4a			
Standard: MA.7.DP.2.3			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>$\frac{1}{3}$</p>	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write $\frac{1}{4}$ may have used the wrong spinner as the size of the sample space.</p>	<p>Response shows limited understanding.</p>

Problem 4b			
Standard: MA.7.DP.2.3			
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>Response shows incomplete understanding with significant errors.</p> <p>Students who write $\frac{1}{4}$ may have written the probability of getting hot fudge as a topping.</p>	<p>Response shows limited understanding.</p>

Problem 5a			
Standards: MA.7.DP.1.3, MTR.6.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: All the students at Rudra's school</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write "the school" may not fully understand who or what about the school makes up the population.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write "longer lunch and longer school day" may have written the subject of interest instead of the population.</p>	<p>Response shows limited understanding.</p> <p>Students who write "20 students" may not understand the difference between sample and population.</p>

Problem 5b			
Standards: MA.7.DP.1.3, MTR.6.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: About 150 students</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response includes a calculation error when applying the ratio $\frac{12}{20}$ to the population of the school.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write 21 may have calculated $\frac{250}{12}$.</p>	<p>Response shows limited understanding.</p>

Problem 5c			
Standards: MA.7.DP.1.3, MTR.6.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p>Less confident. Explanations vary. In Rudra's first sample, over 50% of students agreed. In their second sample, less than 50% agreed. This means that the variation is large, which makes me less confident in my prediction.</p>	<p>Correct response with minor flaws in explanation.</p> <p>Incorrect response with logical and complete explanation.</p> <p>Students who select <i>More confident</i> may have been paying attention to the number of samples drawn rather than the variability between samples.</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				Standard: MA.7.DP.1.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response and complete explanation.</p> <p><i>No. Explanations vary. These are only samples of the 6th graders and 7th graders at Maneli's school, not the full populations.</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>Incorrect response with no explanation.</p>	

Problem 6b				Standard: MA.7.DP.1.2
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response and complete explanation.</p> <p><i>Responses vary. The median is a measure of center for the data. The measure of center changes from 10.5 to 15, which is a large change. This shows that there is a big difference in the number of books read by the two grades.</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>Incorrect response with no explanation.</p>	

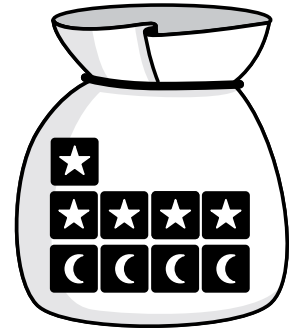
End-of-Unit Assessment

Unit 8

1. You pick a block out of this bag without looking.

What is the probability of picking a block that is *not* a star?

- A. $\frac{1}{4}$ B. $\frac{4}{5}$ C. $\frac{4}{9}$ D. $\frac{5}{9}$

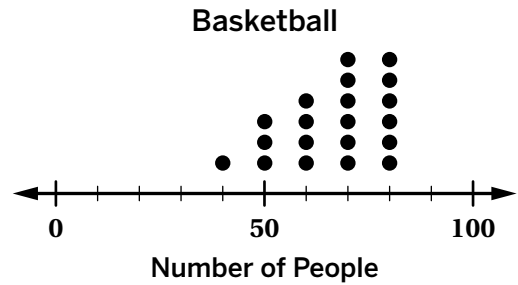
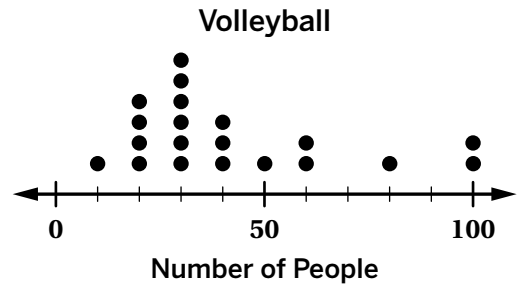


2. Ebony is curious: do more people attend volleyball or basketball games?

She went to a random sample of 40 games (20 volleyball and 20 basketball). At each game, Ebony recorded the number of people.

Based on the data in the dot plots, select *all* of the true statements.

- A. Basketball games tend to get more people to attend than volleyball games.
- B. Volleyball games tend to get more people to attend than basketball games.
- C. Basketball games have a more consistent number of people than volleyball games.
- D. Volleyball games have a more consistent number of people than basketball games.
- E. All basketball games have more people attending than volleyball games.



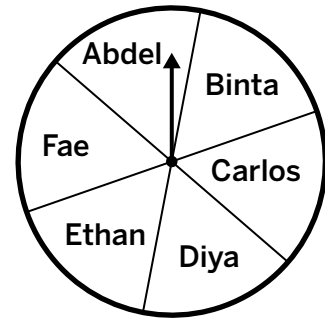
End-of-Unit Assessment (continued)

Unit 8

3. Six friends share an apartment. Each day, they use this spinner with 6 equal sections to determine who will wash the dishes.

Estimate the number of times Binta will be chosen to do the dishes in a month (about 30 days).

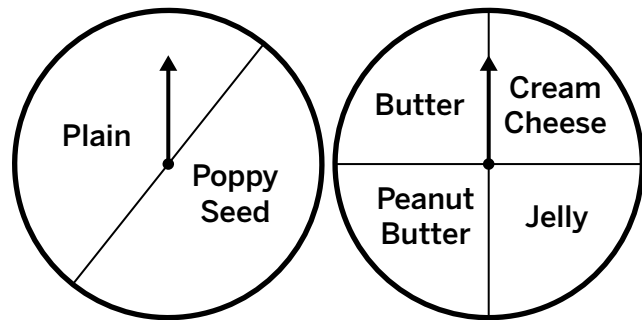
Explain your thinking.



4. The Spin N' Dine Restaurant sells bagels. You can spin to either select one random type of bagel OR one random spread.

a What is the probability of getting a plain bagel on your spin?

b What is the probability of NOT getting cream cheese as a topping on your spin?



5. Darius thinks school should start later and wants to know if others agree. He surveys a random sample of 40 students and finds that 26 of them agree.

a What is the population for Darius's question?

b If the school has 240 students, about how many do you predict would agree?

c The next day, Darius surveys another 10 random students and finds that 6 of them agree. Does this make you more or less confident in your prediction?

Explain your thinking.

Standard	MA.7.DP.1.1	MA.7.DP.1.2	MA.7.DP.1.3	MA.7.DP.2.2	MA.7.DP.2.3	MA.7.DP.2.4
Problem(s)	6a	2, 6b	5a, 5b, 5c	1	4a, 4b	3

Problem 1				Standard: MA.7.DP.2.2
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct choice:</p> <p>$\frac{4}{9}$</p>			<p>Incorrect choice.</p> <p>Students who select $\frac{4}{5}$ may have compared total moons to total stars.</p> <p>Students who select $\frac{5}{9}$ may have determined the probability of selecting a star.</p>	

Problem 2				Standards: MA.7.DP.1.2, MTR.6.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Both correct choices and no incorrect choices.</p> <ul style="list-style-type: none"> Basketball games tend to get more people to attend than volleyball games. Basketball games have a more consistent number of people than volleyball games. 	<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 Standards: MA.7.DP.2.4, MTR.4.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation.</p> <p>5 times. <i>Explanations vary.</i> A month has about 30 days. The probability of the spinner landing on Binta is $\frac{1}{6}$. That means the best estimate for how many spins in a month will land on Binta is about $\frac{1}{6}$ of 30, or 5.</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>Incorrect response with no explanation.</p>

Problem 4a Standard: MA.7.DP.2.3			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response:</p> <p>$\frac{1}{2}$</p>	<p>Response shows conceptual understanding with minor errors.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write $\frac{1}{4}$ may have used the wrong spinner as the size of the sample space.</p>	<p>Response shows limited understanding.</p>

Problem 4b Standard: MA.7.DP.2.3			
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>Response shows incomplete understanding with significant errors.</p> <p>Students who write $\frac{1}{4}$ may have written the probability of getting cream cheese as a topping.</p>	<p>Response shows limited understanding.</p>

Problem 5a			
Standards: MA.7.DP.1.3, MTR.6.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: All the students at Darius's school</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>Students who write "the school" may not fully understand who or what about the school makes up the population.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write "school start time" may have written the subject of interest instead of the population.</p>	<p>Response shows limited understanding.</p> <p>Students who write "40 students" may not understand the difference between sample and population.</p>

Problem 5b			
Standards: MA.7.DP.1.3, MTR.6.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response: About 156 students</p>	<p>Response shows conceptual understanding with minor errors.</p> <p>E.g., Response includes a calculation error when applying the ratio $\frac{26}{40}$ to the population of the school.</p>	<p>Response shows incomplete understanding with significant errors.</p> <p>Students who write $\frac{240}{26}$ may have divided the total number of students by the number who agreed in Darius's survey.</p>	<p>Response shows limited understanding.</p>

Problem 5c			
Standards: MA.7.DP.1.3, MTR.6.1			
4 Meeting	3 Approaching	2 Developing	1 Beginning
<p>Correct response and complete explanation. More confident. Explanations vary. In Darius's first sample, over 60% of the students agreed. In his second sample, 60% also agreed. This means that the variation is small, which makes me more confident in my prediction.</p>	<p>Correct response with minor flaws in explanation.</p> <p>Incorrect response with logical and complete explanation.</p> <p>Students who select <i>Less confident</i> may have been paying attention to the number of samples drawn rather than the variability between samples.</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				Standard: MA.7.DP.1.1
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response and complete explanation.</p> <p><i>No. Explanations vary. They sampled 15 students from each class. This is not the whole population.</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>Incorrect response with no explanation.</p>	

Problem 6b				Standard: MA.7.DP.1.2
4 Meeting	3 Approaching	2 Developing	1 Beginning	
<p>Correct response and complete explanation.</p> <p><i>Responses vary. The median is a measure of center for the data. The measures of center is 30 for one class but 20 for another class, which is a large difference. This shows that there is a big difference in the the time that Alena's classmates and Yasmine's classmates spend commuting.</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>Incorrect response with no explanation.</p>	

Unit 8

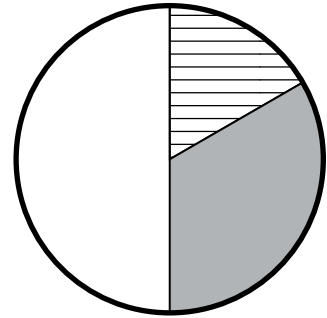
**Show What You
Know PDFs**

Show What You Know



8.01

Here is a new spinner. Write the letter that matches the likelihood of each event happening on one spin. Some letters may be used more than once and some may not be used at all.



- | | |
|--|---------------------------------|
| Landing on a plain area. | a. Impossible |
| Landing on an area with polka dots. | b. Unlikely |
| Landing on a striped area. | c. Equally likely as not |
| Landing on a plain white, striped, or shaded area. | d. Likely |
| | e. Certain |

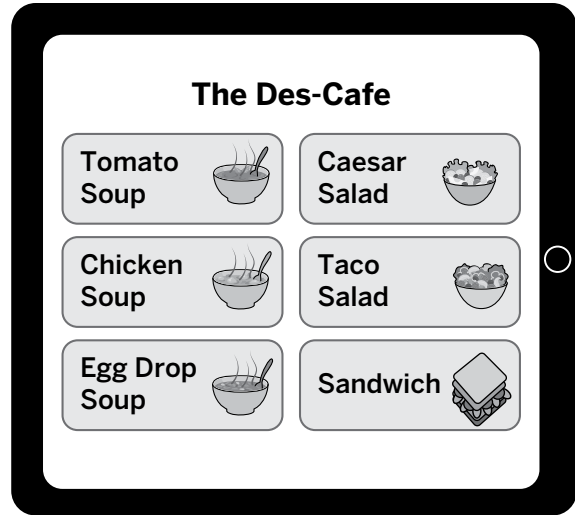
Show What You Know



8.02

Here is a menu from a restaurant.

If one item is selected at random, what is the probability that the item is a salad?



Show What You Know

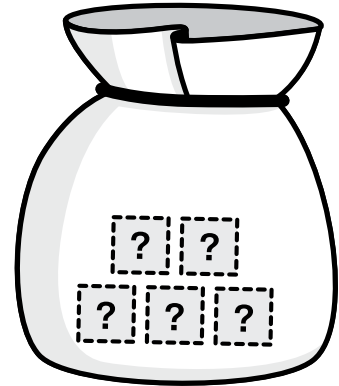
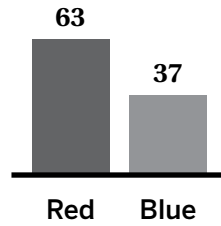


8.03

A new bag has 5 blocks. Some are red and some are blue.

Based on these results, how many blocks are likely to be red? Show or explain your thinking.

Total Picks: 100



Show What You Know

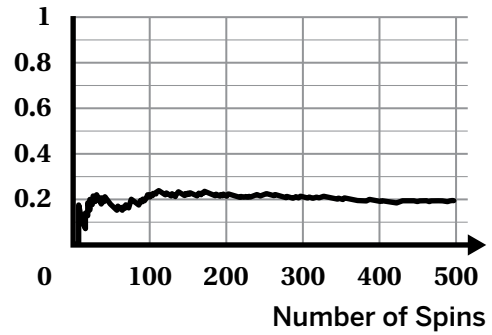


8.04

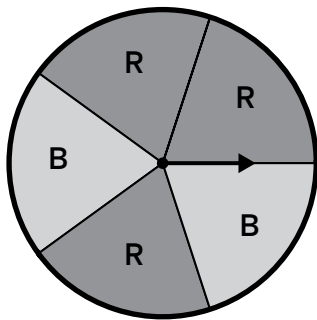
The graph shows the relative frequency of spinning red over 500 spins.

Which spinner is most likely to have produced this graph?

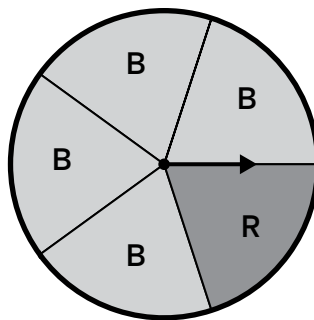
Relative Frequency of Spinning Red



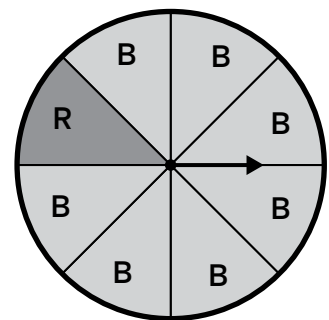
A.



B.



C.



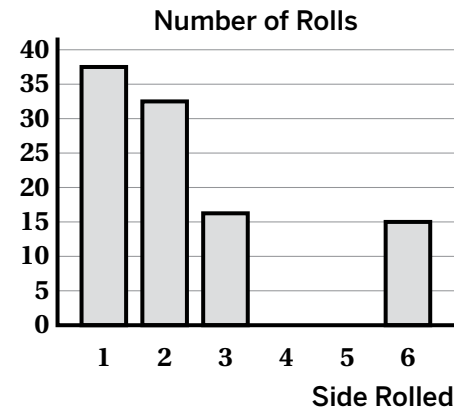
Explain your thinking.

Show What You Know**8.05**

This graph shows the results of 100 rolls with an unfair number cube.

Based on the results, which is the most likely probability of rolling a one?

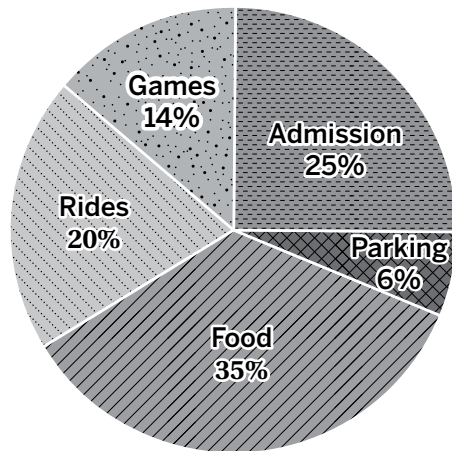
- A. $\frac{1}{2}$
- B. $\frac{1}{3}$
- C. $\frac{1}{4}$
- D. $\frac{1}{6}$



Explain your thinking.

Show What You Know**8.06**

Use the circle graph below.

Family Fair Budget

Suppose your family spends \$180 dollars at the county fair. How much of that money is spent on food? Show or explain your reasoning.

Show What You Know

**8.07**

Choose an appropriate display for each situation. Explain your reasoning.

1. The favorite type of music of students in your grade
2. The median amount of money raised by each student during a charity campaign
3. The points scored by each player on a basketball team
4. Choose *all* the situations that would best be displayed in a line plot.
 - A. favorite type of television show
 - B. heights of tallest buildings in the world
 - C. ages of students in a chess club
 - D. number of students on a swim team
 - E. percent of students in favor of, against, or neutral regarding a new class mascot

Show What You Know



8.09

Here is a new data set: 4, 5, 5, 6, 8, 8

- a Calculate the mean.
- b Calculate the range.

Show What You Know**8.11**

20 random students from Median Middle School were asked what superpower they wanted. Here are the results.

Median Middle School has 500 students. Estimate the number of students who want teleportation. Show or explain your thinking.

Superpower	Number of Students
Teleportation	4
Flight	3
Super strength	3
Time travel	5
Invisibility	5

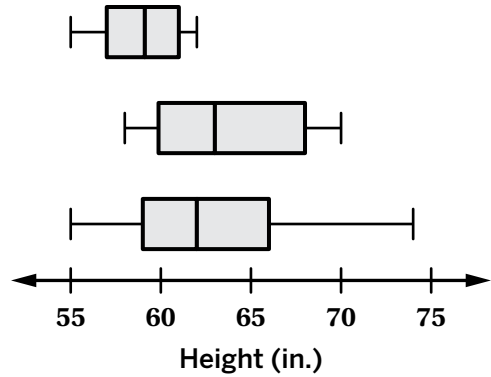
Show What You Know



8.12

Omari wants to know the median height of all 200 students at his dance school. He sampled 20 students on three different days and recorded their heights.

- a Predict the median height of *all* students at Omari's dance school.



- b Explain how accurate you think your prediction is.

Show What You Know



8.13

Caasi wonders if students watched more movies over winter break than teachers.

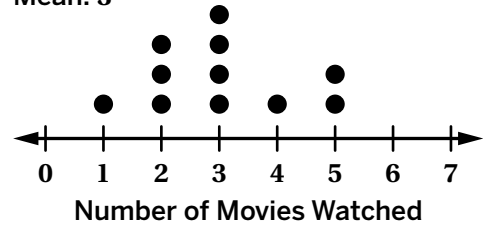
After collecting data from a random sample of 11 students and 11 teachers, She claimed that the difference wasn't that big.

Based on her strategy, is Caasi's claim correct?

Use evidence to support your claim.

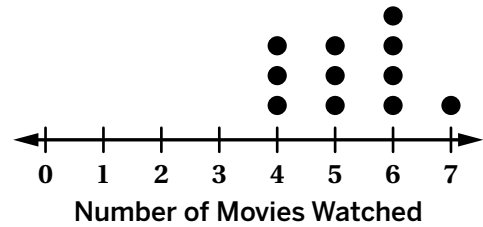
Teachers

Mean: 3




Students

Mean: 5.3



Show What You Know Lesson 9

Name: _____ Date: _____ Period: _____

Show What You Know  **8.09**

Here is a new data set: 4, 5, 5, 6, 8, 8


a Calculate the mean.
6

b Calculate the range.
4

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Show What You Know Lesson 10

Name: _____ Date: _____ Period: _____

Show What You Know  **8.10**

Ariel wants to know: What is the most popular chip flavor among teenagers in the United States?


a What is the population for Ariel's question?
The population is all teenagers in the United States.

b What is a sample Ariel could use to help answer this question?
A sample could be the teenagers at her school.

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Show What You Know Lesson 11

Name: _____ Date: _____ Period: _____

Show What You Know  **8.11**

20 random students from Median Middle School were asked what superpower they wanted. Here are the results.


Superpower	Number of Students
Teleportation	4
Flight	3
Super strength	3
Time travel	5
Invisibility	5

Median Middle School has 500 students. Estimate the number of students who want teleportation. Show or explain your thinking.
100 students. Responses vary. First, I found the percentage of students from the random group who want teleportation as their superpower, which was $\frac{4}{20}$ or 0.20. Then, I multiplied 0.20 and 500 to estimate the number of students at the school who want the same superpower, which was $0.20 \times 500 = 100$ student.

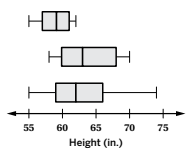
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Show What You Know Lesson 12

Name: _____ Date: _____ Period: _____

Show What You Know  **8.12**

Omari wants to know the median height of all 200 students at his dance school. He sampled 20 students on three different days and recorded their heights.




a Predict the median height of all students at Omari's dance school.
Responses between 58 and 63 are considered correct.

b Explain how accurate you think your prediction is.
Explanations vary. Because the sample medians and IQRs are all similar, I think my prediction is pretty accurate.

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Show What You Know Lesson 13

Name: _____ Date: _____ Period: _____

Show What You Know  **8.13**

Caasi wonders if students watched more movies over winter break than teachers.

After collecting data from a random sample of 11 students and 11 teachers, she claimed that the difference wasn't that big.

Based on her strategy, is Caasi's claim correct?

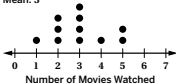
No

Use evidence to support your claim.

Explanations vary. Caasi's claim is incorrect because the difference between the means is $5.3 - 3 = 2.3$. There is a small difference between the number of movies watched by each population.

Teachers

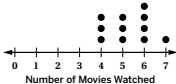
Mean: 3



Number of Movies Watched

Students

Mean: 5.3



Number of Movies Watched

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Lesson Resources

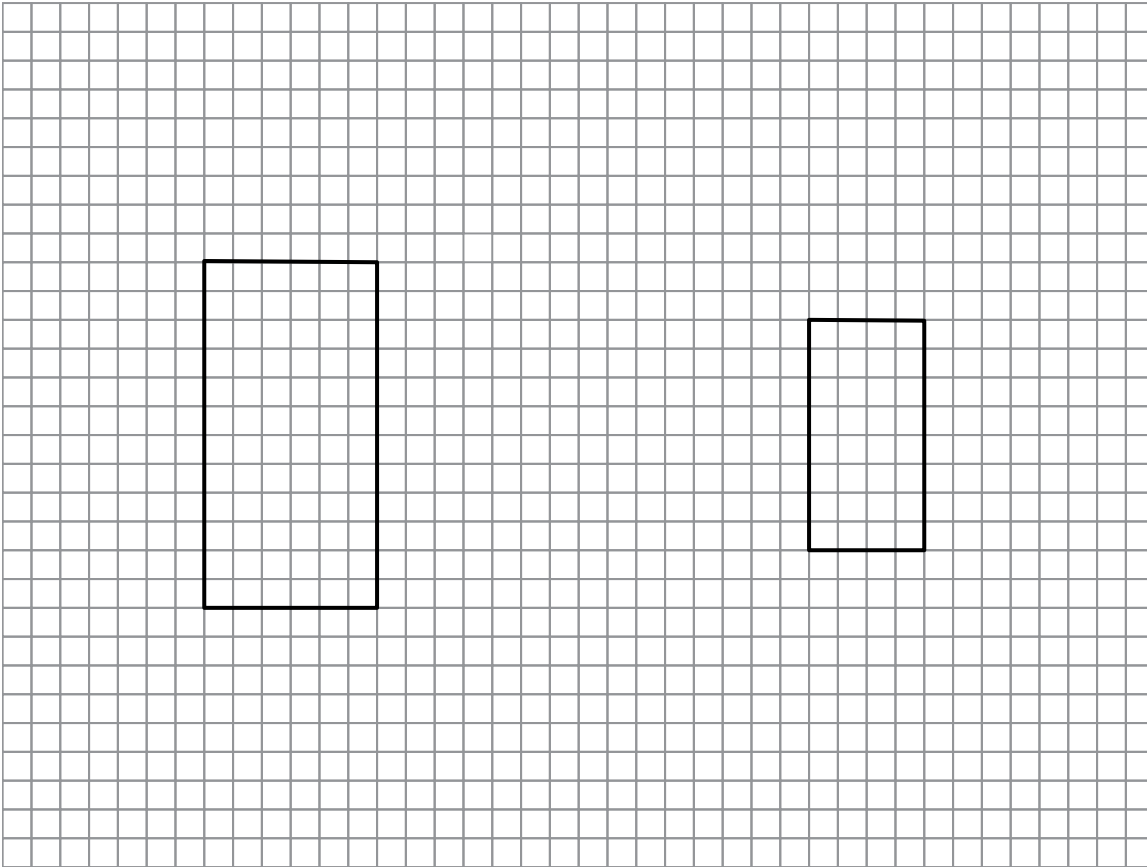
Unit 1

Activity Sheets and Cards

Name: Date: Period:

You're invited to explore more.

Design your own robot on the left. Then complete its scaled copy on the right.

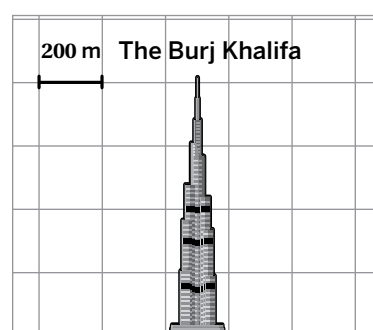
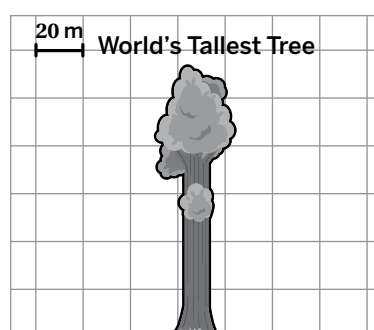
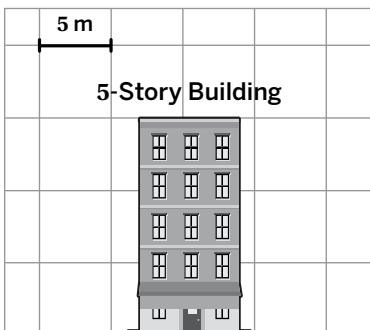
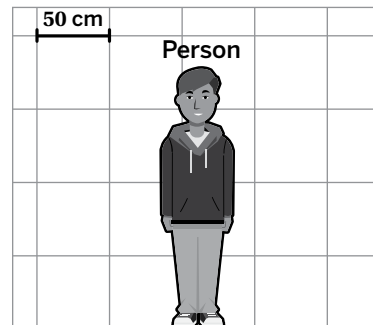
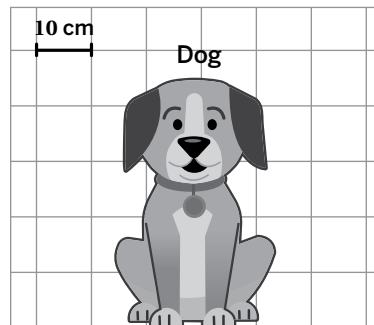
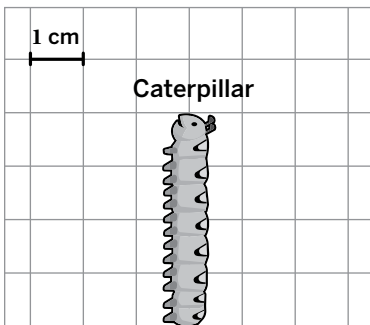
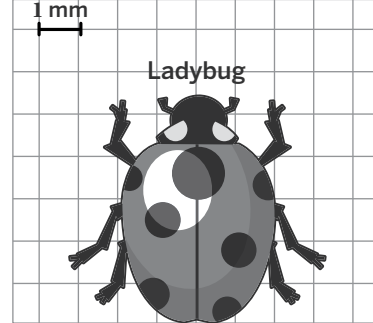
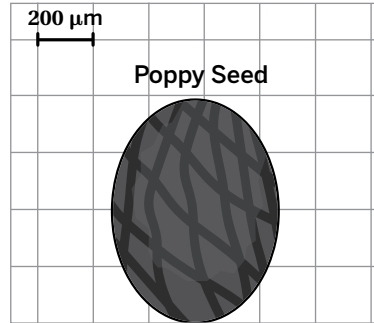
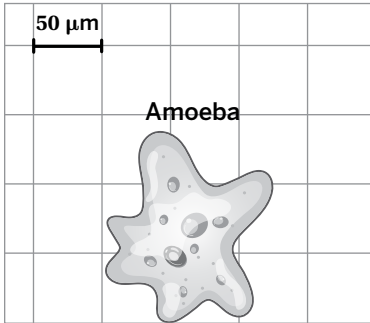


Name: _____ Date: _____ Period: _____

Scale

Estimate the actual height of each object.

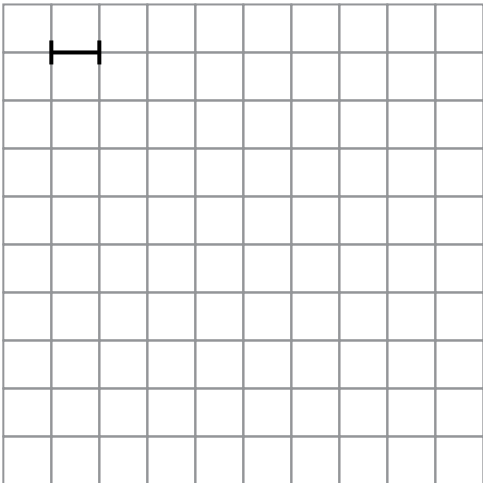
Note: μm means micrometer, which is one millionth of a meter.



Name: _____ Date: _____ Period: _____

Explore More

- a Select a scale.
- A. 1 unit to 1 cm
 - B. 1 unit to 1 m
 - C. 1 unit to 1 km
- b List several objects that could be drawn on this grid using this scale.
- c Create a scale drawing of one of those objects using the scale you selected.



Unit 2

**Activity Sheets
and Cards**

Name: _____ Date: _____ Period: _____

Colorful Challenge

- Create your own paint color by filling in the amounts for *at least* two colors.

	Red Paint (cups)	Blue Paint (cups)	Green Paint (cups)	White Paint (cups)
Original Mixture				

- Name your paint color and describe what you think it looks like.
- Add a new amount of one color to the table. Then challenge your classmates to fill in the missing amounts and match your original paint color.

	Red Paint (cups)	Blue Paint (cups)	Green Paint (cups)	White Paint (cups)
New Mixture That Matches				

Name: Date: Period:

You're invited to explore more.

Here are some facts about this truck:

- It travels at an average rate of 50 miles per hour.
- It can travel 6 miles for each gallon of gas.

How many hours can the truck travel without stopping if it has a full tank of 150 gallons?

Explain your thinking.



Name: _____ Date: _____ Period: _____

You're invited to explore more.

Observe how the number of circles changes at each stage.

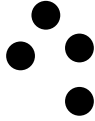
Stage 0



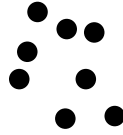
Stage 1



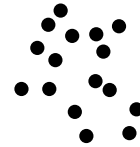
Stage 2



Stage 3



Stage 4



a Complete the table.

Stage	Number of Circles
0	1
1	
2	
3	
4	

b Does this represent a proportional relationship? Circle one.

Yes No

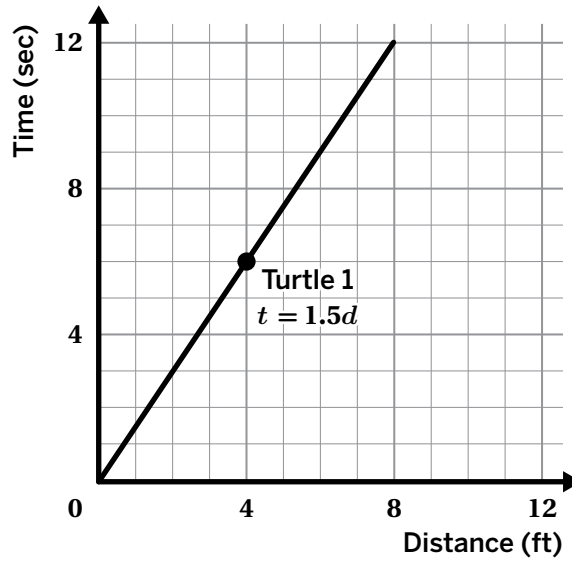
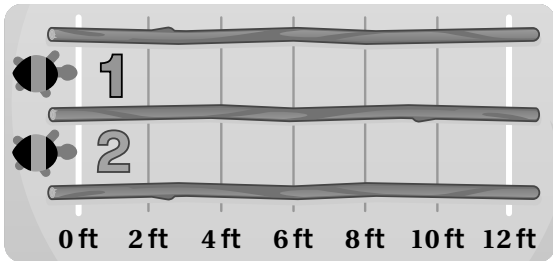
Explain your thinking.

Name: _____ Date: _____ Period: _____

You're invited to explore more.

The graph shows the line for Turtle 1.

Draw a line for Turtle 2 so that it's slower than Turtle 1. Notice the axis labels!



Unit 3
**Activity Sheets
and Cards**

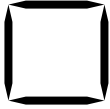
Name: Date: Period:

You're invited to explore more.

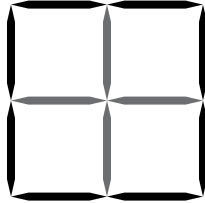
Determine the number of toothpicks needed to build the perimeter and interior of the 100th stage of each pattern.

Pattern A

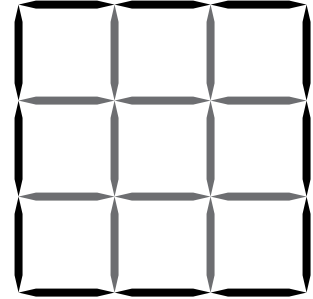
Stage 1



Stage 2



Stage 3

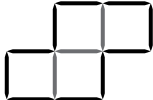


Perimeter of Stage 100:

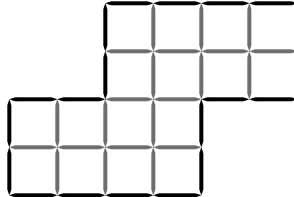
Interior of Stage 100:

Pattern B

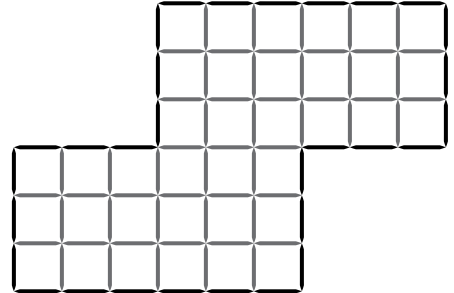
Stage 1



Stage 2




Stage 3



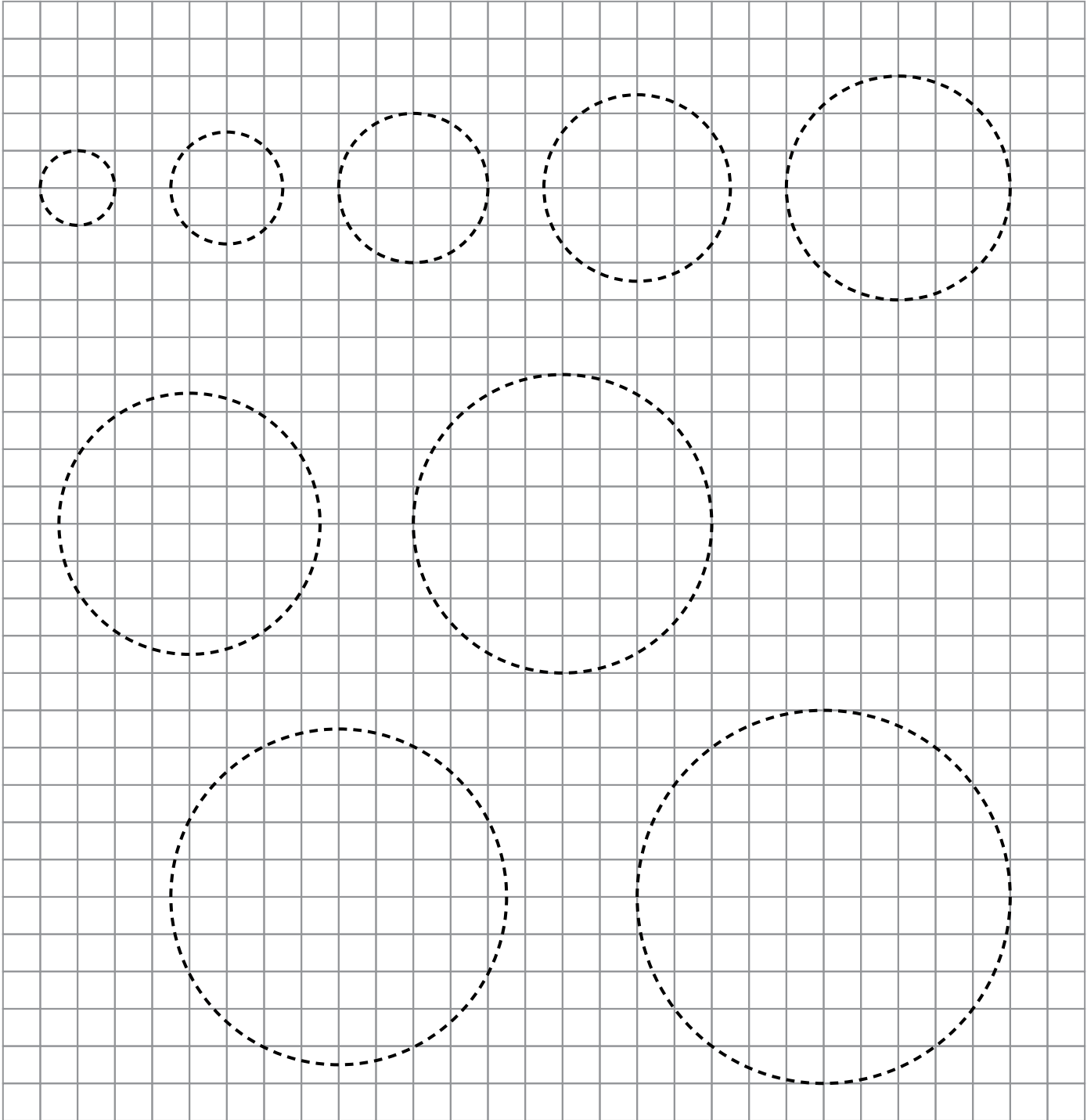
Perimeter of Stage 100:

Interior of Stage 100:

Circle Centers

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

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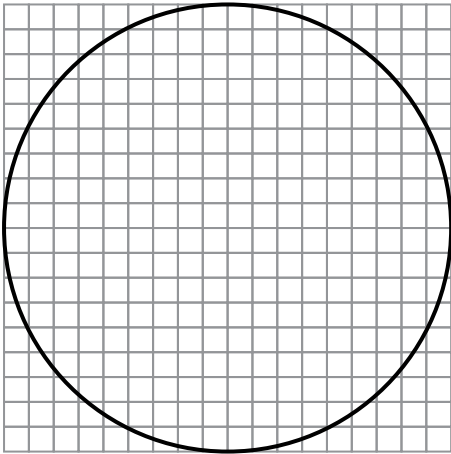


Squares Cover Circle

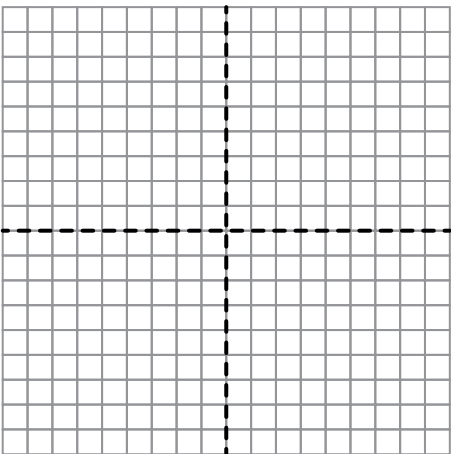
✂ **Directions:** Make one copy per group of students. Then pre-cut the cards and give each group of students one set.

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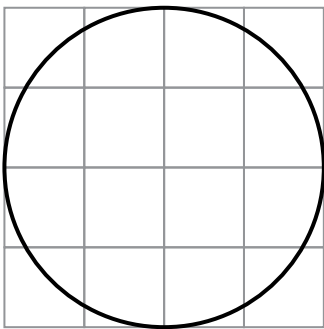
Circle *A*



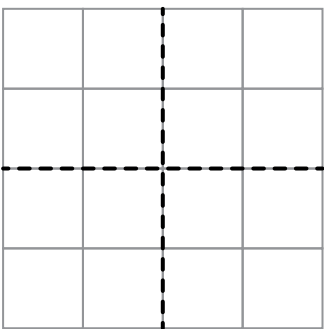
Radius Squares for Circle *A*



Circle *B*



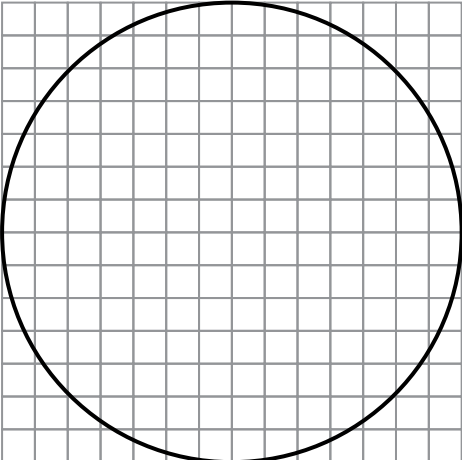
Radius Squares for Circle *B*



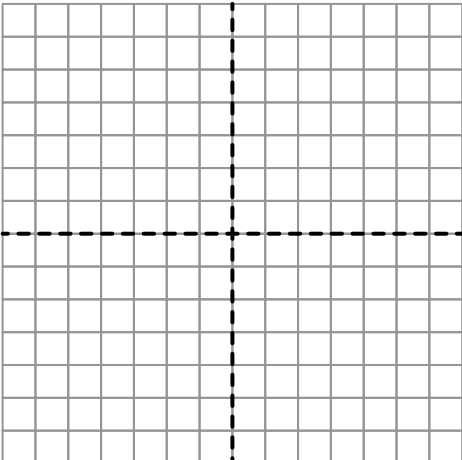
Squares Cover Circle

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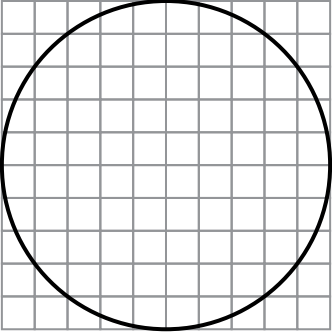
Circle C



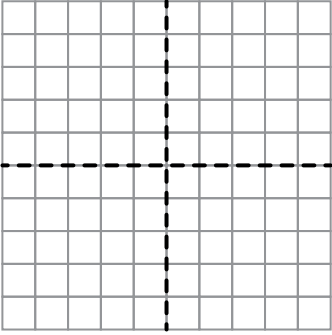
Radius Squares for Circle C



Circle D



Radius Squares for Circle D



Piecing It Together

 **Directions:** Perform these steps to form a rectangle from a circle.

Step 1: Highlight the circumference with a highlighter.

Step 2: Cut out the circle.

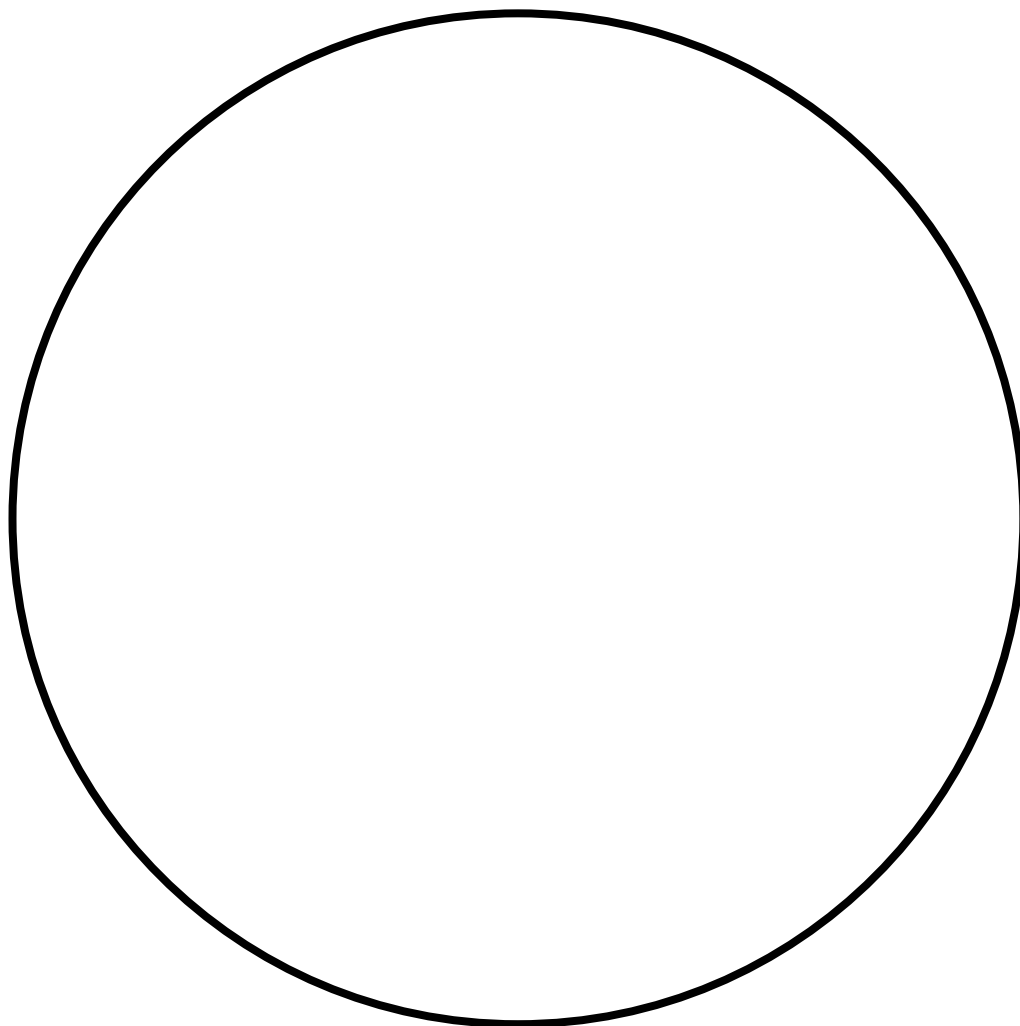
Step 3: Fold the circle in half 4 times to form 16 equal-sized wedges.

Step 4: Cut out the 16 wedges.

Step 5: Use the wedges to form a rectangle. Place down the first wedge pointing up, then alternate wedges pointing down and up until all are used.

Step 6: Tape the wedges together so they stay in place.

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Unit 4

**Activity Sheets
and Cards**

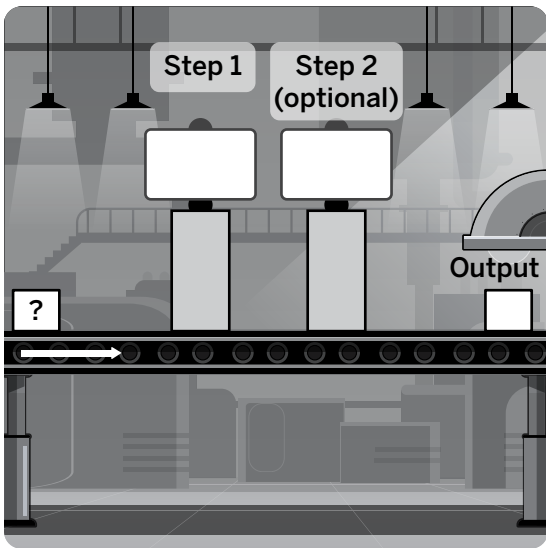
Name: Date: Period:

My Percent Machine

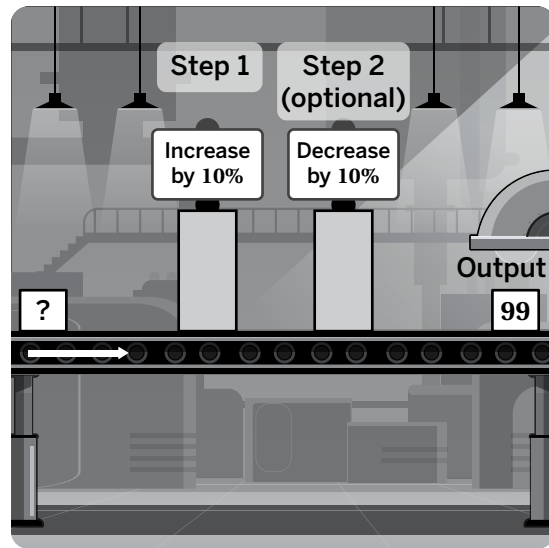
It's time to create your own percent machine!

- Choose whether your machine will have one or two steps.
- Write in the percent increase or decrease for each step. See the example.
- Write an output.
- Fill in the table for your machine in your Student Edition.

My Machine



Example

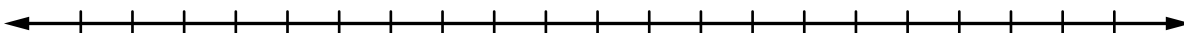
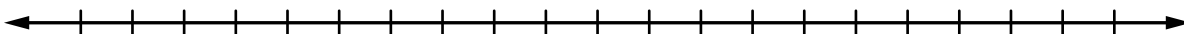
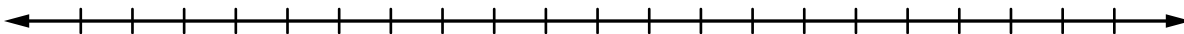
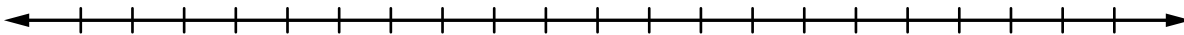
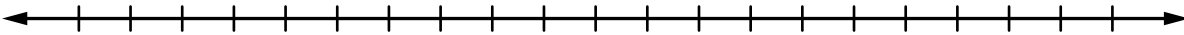
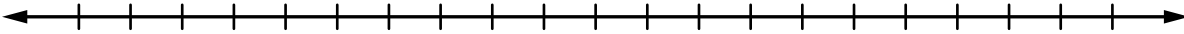
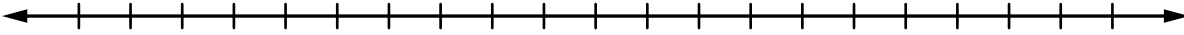
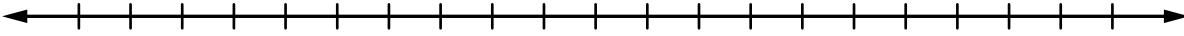


Unit 5

**Activity Sheets
and Cards**

Horizontal Number Lines

Use the horizontal number lines to help with your thinking. Label your diagram.



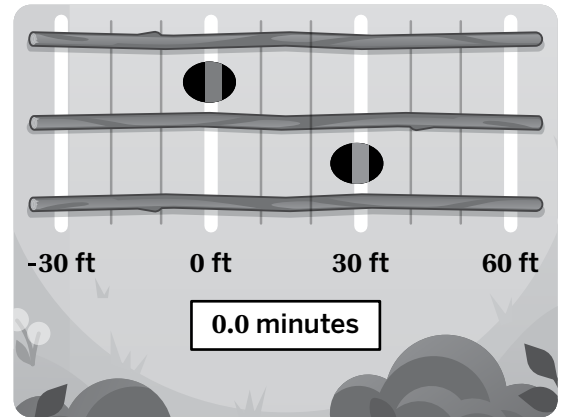
Name: _____ Date: _____ Period: _____

You're invited to explore more

5 minutes ago, these turtles were at the same position.

What could their walking rates be?

Determine several possible pairs of rates.



Pair 1:

Turtle	Position (ft)	Rate (ft/min)
Top	0	
Bottom	30	

Pair 2:

Turtle	Position (ft)	Rate (ft/min)
Top	0	
Bottom	30	


Pair 3:

Turtle	Position (ft)	Rate (ft/min)
Top	0	
Bottom	30	

Pair 4:

Turtle	Position (ft)	Rate (ft/min)
Top	0	
Bottom	30	

More Numerical Expressions

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

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Card 1

14

Problem:

$$|-8|\left(\frac{1}{4} \times 8\right) \times 3 + 1$$

Card 2

131

Problem:

$$(13 - |2|) + 2 \div 0.4$$

Card 3

0

Problem:

$$-6 + \left(-\frac{1}{4} \times (-48)\right)^2 - |-7|$$

Card 4

10

Problem:

$$8(-0.2 + 4.35 \div 3) + 8 \times 4^2$$

More Numerical Expressions

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Card 5

49

Problem:

$$20 \div (3 + |2|) - 1 \times 4$$

Card 6

4

Problem:

$$2|-5| + 4^2 - 20 + 8$$

Card 7

16

Problem:

$$(21 \div |-3|) - 6 + 3^2$$


Card 8

138

Problem:

$$21 - 5 \times 2^2 + |6 - 9|$$

Power Pairs

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

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Card A

$$16 \cdot 2$$

Card B

$$(5 \cdot 5) \cdot (2 \cdot 2)$$

Card C

$$5^6$$

Card D

$$4^3$$

Card E

$$2^4 \cdot 2^2$$

Card F

$$2^5$$

Card G

$$5^4 \cdot 5^2$$

Card H

$$25^4$$

Card I

$$10^4$$

Card J

$$25 \cdot 25 \cdot 25 \cdot 25$$

Card K

$$10^2$$

Card L

$$(2^3)^2$$

Card M

$$(5^4)^2$$

Card N

$$(10^1)^4$$

Card O

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

Card P

$$100$$

Card Q

$$5^2 \cdot 2^2$$

Card R

$$10 \cdot 10 \cdot 10 \cdot 10$$

Card S

$$5^3 \cdot 5^2 \cdot 5^3$$

Card T

$$10,000$$

Unit 6

Activity Sheets and Cards

Challenge Creator

Follow the steps below to create your own hanger diagram challenge.

- a** Choose two shapes for your hanger.

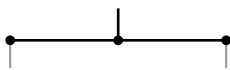


Square Circle Triangle Pentagon

- b** Write the names of the shapes you chose below. Then write a weight for the *first shape only*.

Weight of	Weight of

- c** Create a balanced hanger using your two chosen shapes.




- d** Do not determine the weight of the second shape on this page. You and your classmates will determine the weight on the lesson page.

Similar Problems

Here are three sets of related situations.

	Situation A	Situation B
Set 1	<p>6 members of the Martinez family are going to their school's Community Day. They have a coupon for \$4.50 off each ticket. If they pay \$40.50 for all their tickets, how much does one ticket cost without the coupon?</p>	<p>6 members of the Benton family are going to their school's Community Day. They have a coupon for \$4.50 off their total. If they pay \$40.50 for all their tickets, how much does one ticket cost without the coupon?</p>
Set 2	<p>Kwabena and Trevon are working together tossing bean bags to one side of a scale in order to balance a giant 15-pound stuffed animal. They're successful after Kwabena tosses 13 bean bags and Trevon tosses 8 bean bags onto the scale. How much does each bean bag weigh?</p>	<p>Adah and Ivan are working together tossing bean bags to one side of a scale in order to balance a giant 15-pound stuffed animal. They're successful after Adah tosses 13 small bean bags and Ivan tosses one giant 8-pound bean bag onto the scale. How much does each small bean bag weigh?</p>
Set 3	<p>Marquis and Yolanda plan to sell T-shirts at their school's Community Day. They make 25 shirts and each costs \$15 to make. If they would like to make \$320 in profit, how much should they sell each T-shirt for?</p>	<p>Melissa and Cameron plan to sell T-shirts at their school's Community Day. They spend \$25 on supplies and make 15 shirts. If they would like to make \$320 in profit, how much should they sell each T-shirt for?</p>

Card Sort: Solve It!

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

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Situation Card A

The school marching band has a \$450 budget. They need to buy 15 new uniforms. How much could the marching band spend on each uniform?

Support Card A

After reading the problem:

1. What information is important?

After your partner writes an inequality:

2. How could you start solving?

After your partner solves the inequality:

3. What does your solution mean?
4. Do you need to round your solution?

Situation Card B

LaShawn is a farmer in a city. He needs 15 bags of fertilizer for his garden. He currently has 9 bags of fertilizer. How many bags of fertilizer does he need to buy?

Support Card B

After reading the problem:

1. What is the problem about?
2. What information is important?

After your partner writes an inequality:

3. What does the variable represent?

After your partner solves the inequality:

4. Is the endpoint included in the solution?
5. What does your solution mean?

Card Sort: Solve It!

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Situation Card C

Rudra is taking some friends to dinner. He has a coupon for \$20 off the total cost of the meal. If Rudra has \$65, how much can the group of friends spend on dinner?

Support Card C

After reading the problem:

1. What information is important?

After your partner writes an inequality:

2. What does the variable represent?
3. How could you start solving?

After your partner solves the inequality:

4. Is the endpoint included in the solution?
5. What does your solution mean?

Situation Card D

Adriana's apartment building has a washing machine that uses a card for payment. She has 8 loads of laundry to do. Each load costs \$1.65. How much money should Adriana put on the card?

Support Card D

After reading the problem:

1. What is the problem about?
2. What information is important?

After your partner writes an inequality:

3. What does the variable represent?
4. How could you start solving?

After your partner solves the inequality:

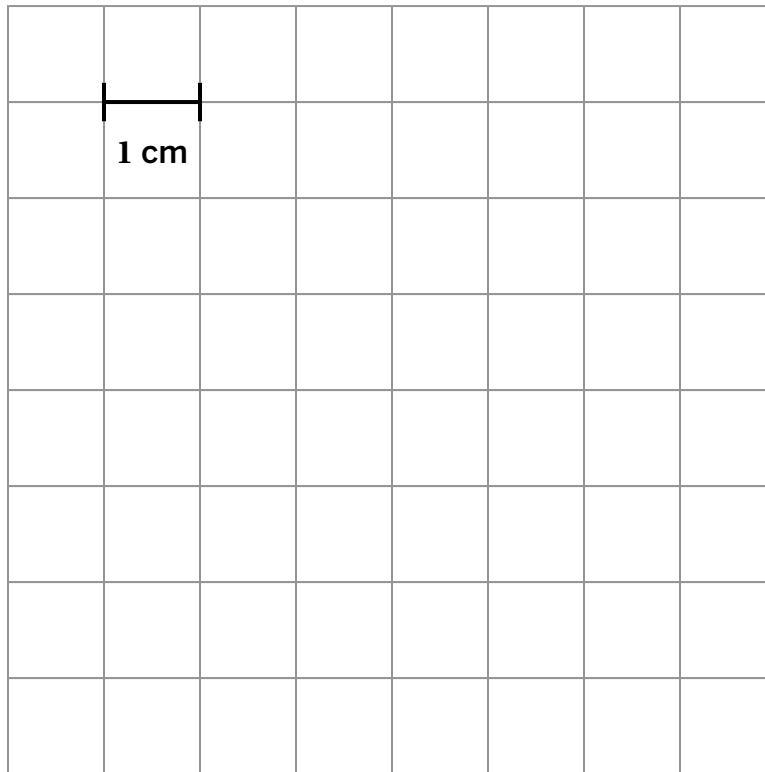
5. What does your solution mean?

Unit 7

**Activity Sheets
and Cards**

Challenge Creator

- Create a 4-sided, 5-sided, or 6-sided polygon on this grid.
- Calculate the area of your polygon in your Student Edition. (Don't write it on this page!)

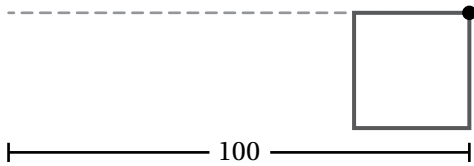


Card Sort: Greatest Total Area

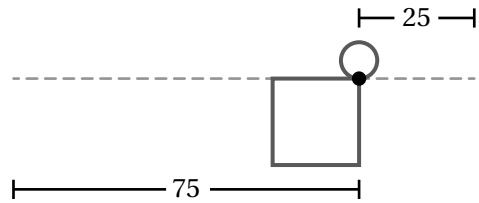
✂ **Directions:** Make one copy per pair of students. Then pre-cut the cards and give each pair of students one set.

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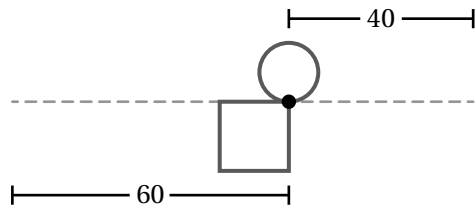
Card 1



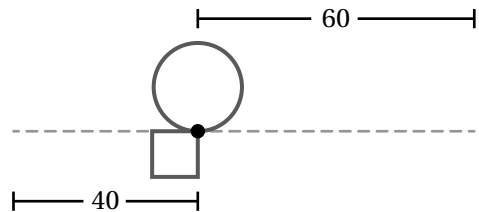
Card 2



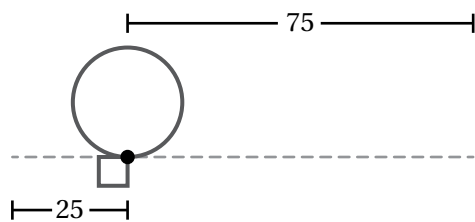
Card 3



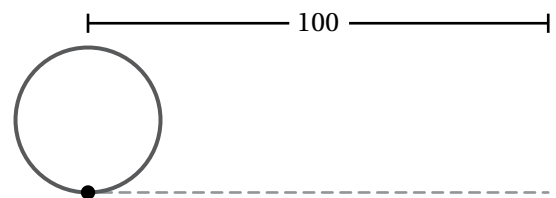
Card 4



Card 5




Card 6



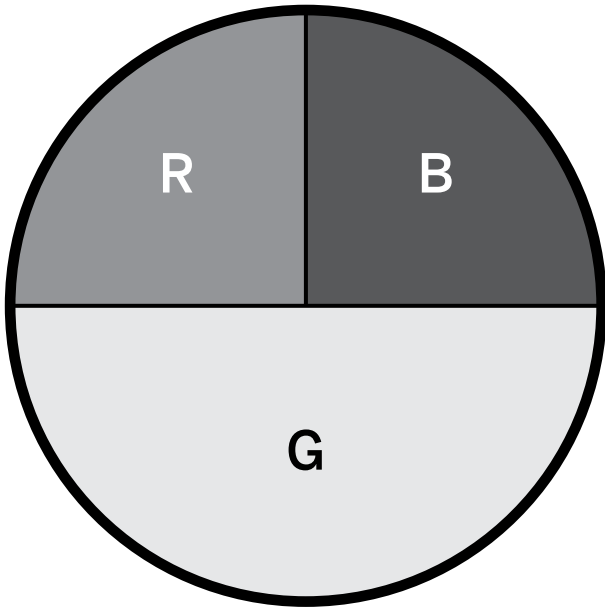
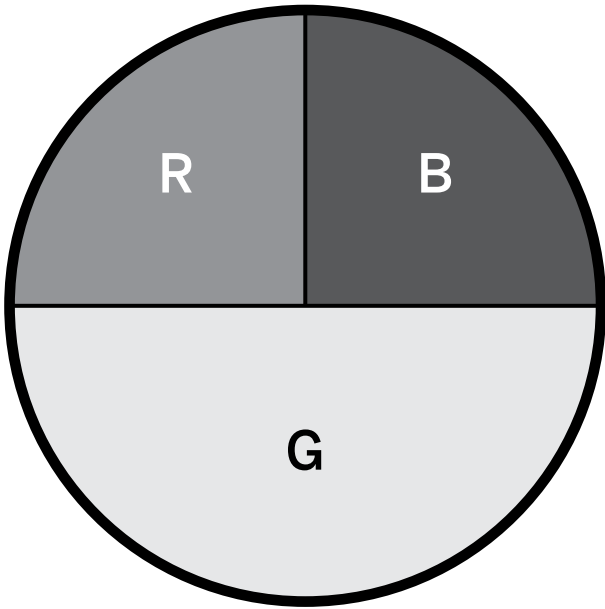
Unit 8

**Activity Sheets
and Cards**

Experiment Stations

 **Directions:** Make one copy per two groups of students. This page contains pieces for two Spinner stations and two Random Letters stations. Pre-cut the spinners. Cut out and fold each letter in TENNESSEE and place them in a bowl or bag for students to draw at random.

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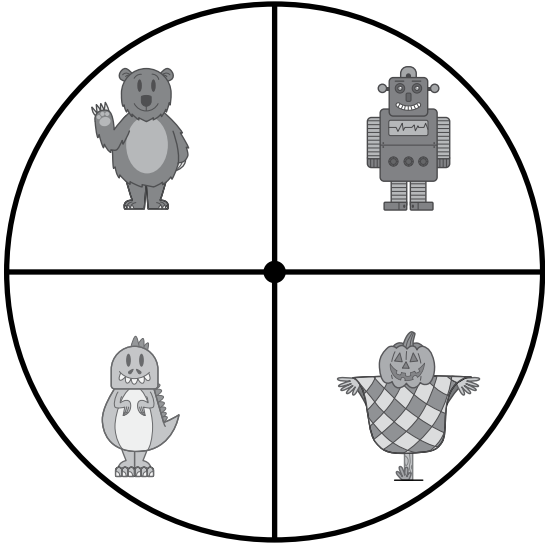
E

E

Name: Date: Period:

Probability and Sample Spaces

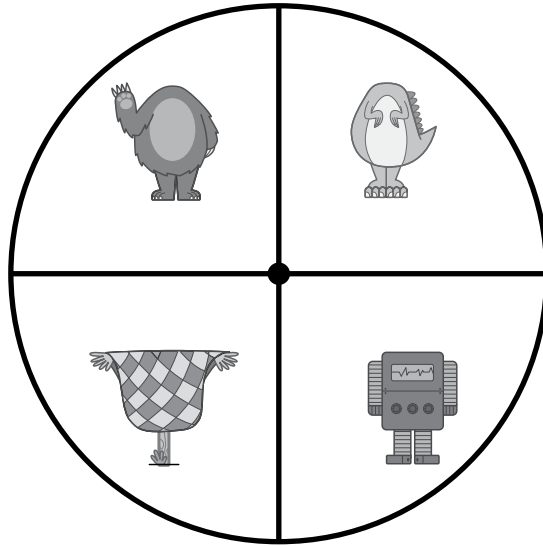
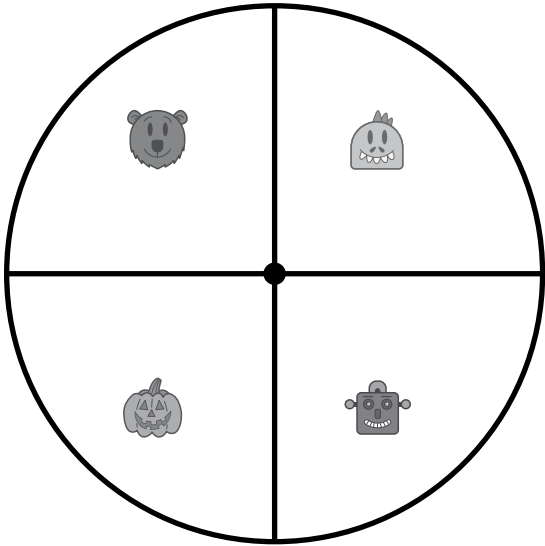
Unfold one end of a paper clip to use as the pointer. Use a pencil to hold the rounded (closed) end of the paper clip in the center of the spinner. Spin the paper clip around the pencil.



Name: Date: Period:

Prob-bear-ly Mismatched

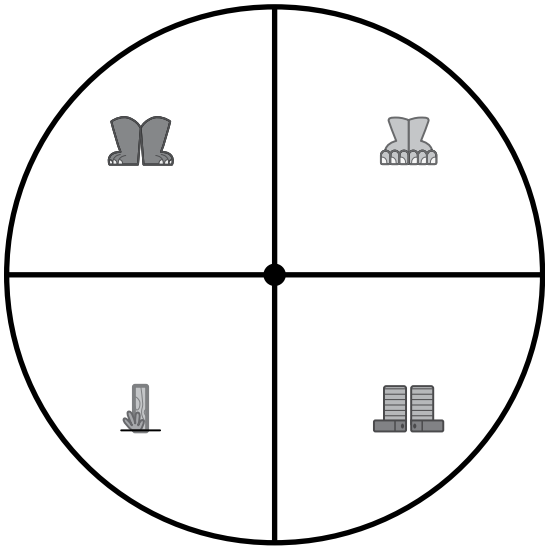
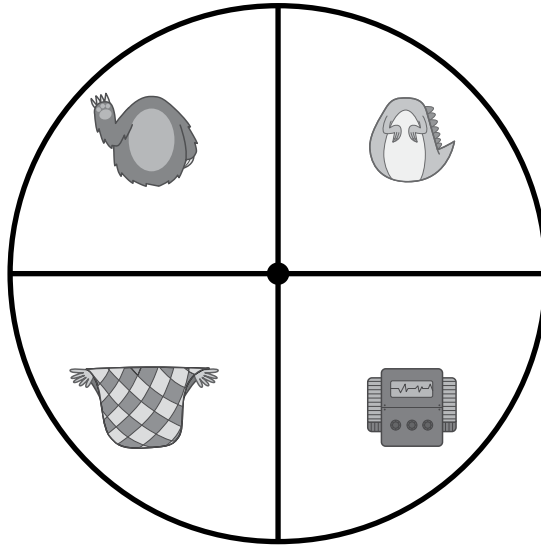
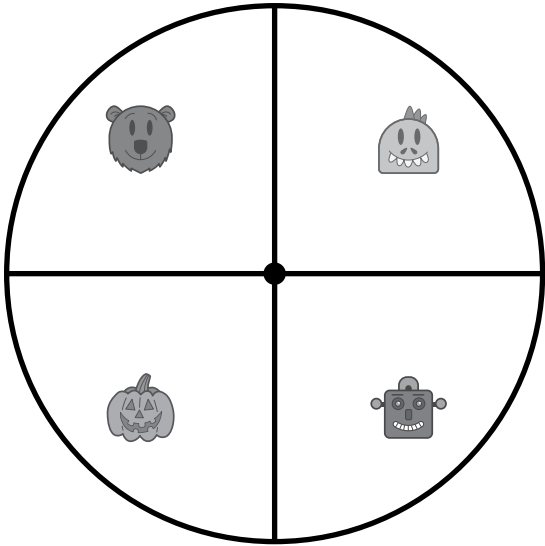
Unfold one end of a paper clip to use as the pointer. Use a pencil to hold the rounded (closed) end of the paper clip in the center of the spinner. Spin the paper clip around the pencil. Spin both spinners to complete one spin.



Name: Date: Period:

Explore More

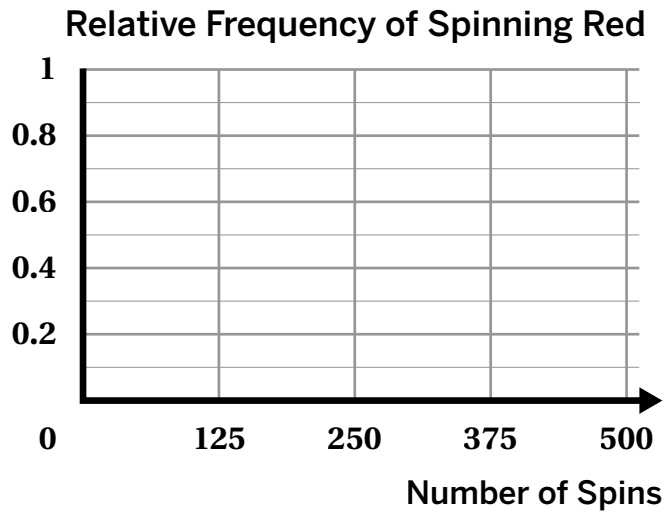
Unfold one end of a paper clip to use as the pointer. Use a pencil to hold the rounded (closed) end of the paper clip in the center of the spinner. Spin the paper clip around the pencil. Spin all three spinners to complete one spin.



Name: Date: Period:

Challenge Creator

Sketch a graph like the ones in Activity 2 based on the probability of spinning red (R) on your spinner. Include a dashed line that shows the probability.



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