

Focused Mathematics Intervention

Lessons and Activities

Level 6

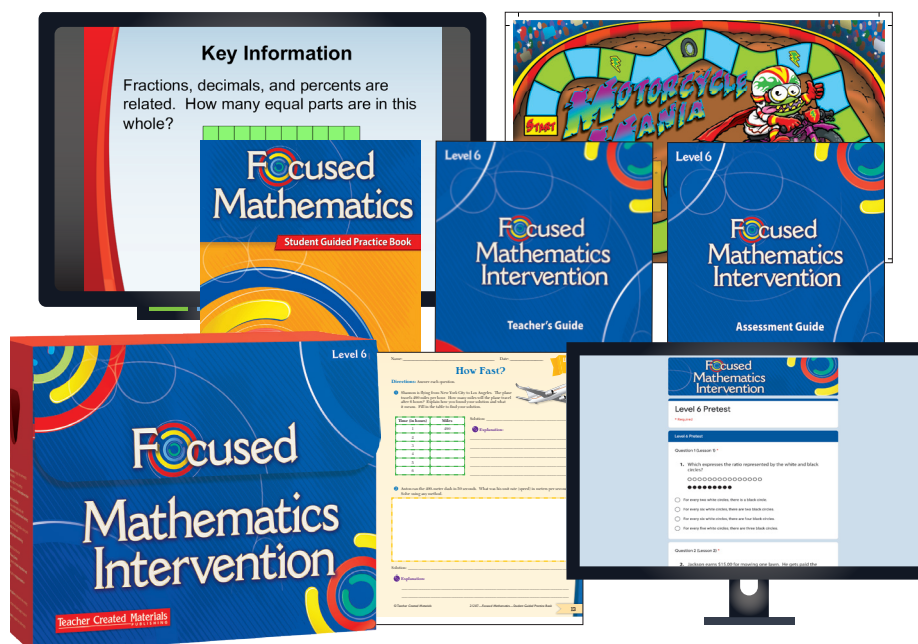
Table of Contents

Teacher's Guide Cover (1 page)

Teacher's Guide Table of Contents (1 page)

How to Use This Product (3 pages)

Lesson Plan (17 pages)



Level 6

Focused Mathematics Intervention

Teacher's Guide

Teacher Created Materials
PUBLISHING

Table of Contents

Welcome

Program Welcome.....	4
----------------------	---

Research

Research on Mathematics Intervention	6
The Need for Intervention.....	7
Response to Intervention in Mathematics....	8
Components of Effective Mathematics Interventions	10
High-Yield Strategies for Increasing Student Achievement	12
Using Technology to Improve Mathematical Learning.....	13
Using Games to Motivate Struggling Math Learners	14
Assessment	15

Best Practices

Components of Effective Mathematics Intervention Programs.....	17
Differentiation	19
Differentiating by Specific Needs	19
Developing Academic Vocabulary.....	21
Academic Vocabulary	21
Developing Math Skills Using Concrete Models	22
Developing Mathematical Problem-Solving Skills.....	24
Why We Teach Problem Solving	24
Making Connections.....	24
A Problem-Solving Framework	25
Math in the Real World	28
Developing Math Fluency Skills	29

How to Use This Product

Kit Components	31
Getting Started.....	32
Teaching a Lesson	33
Using the Math Fluency Games	35
How to Organize and Manage Games.....	35
Playing the Math Fluency Game Sets.....	36
Playing the Digital Math Fluency Games.....	39
Using the Technology Options.....	40

Planning for Intervention

Pacing Plans	41
Correlations	45

Introduction to Correlations	45
Standards Correlations	46
Series Scope and Sequence	49

Lessons

Lesson 1: Writing Ratios.....	61
Lesson 2: Using Unit Rates	69
Lesson 3: Using Ratios and Rates	77
Lesson 4: Exploring Percents.....	85
Lesson 5: Using Percent.....	93
Lesson 6: Division with Fractions	101
Lesson 7: Finding the Greatest Common Factor.....	109
Lesson 8: Least Common Multiple	117
Lesson 9: Operations with Decimals	125
Lesson 10: Graphing Rational Numbers....	133
Lesson 11: Order of Rational Numbers....	141
Lesson 12: Absolute Value and Distance in the Plane	149
Lesson 13: Evaluating Expressions with Exponents	157
Lesson 14: Reading and Writing Expressions.....	165
Lesson 15: Evaluating Expressions	173
Lesson 16: Equivalent Expressions	181
Lesson 17: Simplifying Expressions.....	189
Lesson 18: Writing Expressions for Real-Life Situations.....	197
Lesson 19: Writing and Solving Addition Equations	205
Lesson 20: Writing and Solving Multiplication Equations.....	213
Lesson 21: Solutions to Inequalities	221
Lesson 22: Graphing Inequalities	229
Lesson 23: Independent and Dependent Variables	237
Lesson 24: Analyzing Graphs	245
Lesson 25: Area of Right Triangles	253
Lesson 26: Area of Shapes	261
Lesson 27: Unit Volume	269
Lesson 28: Surface Area	277
Lesson 29: Mean, Median, Range	285
Lesson 30: Interpret Data with Box Plots.....	293

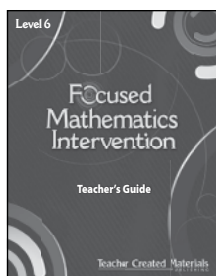
Appendices

Appendix A: References Cited	301
Appendix B: Teacher Glossary.....	304
Appendix C: Digital Resources Charts	312

Kit Components

Teacher's Guide

30 easy-to-use, standards-based lesson plans



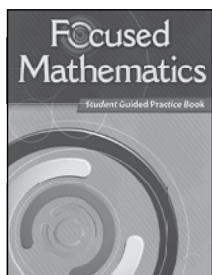
3 Digital Math Fluency Games

Focus on mathematical skills and strategies, and are on the Digital Resources USB Device



Student Guided Practice Book

Full-color student activities

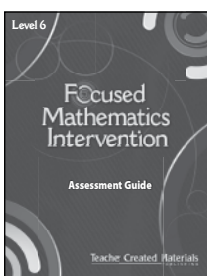


Digital Resources

- PDFs of all student materials, game sets, activity sheets, assessments, etc.
- PDFs of teacher resources
- Digital Math Fluency Games
- Electronic versions of the Pretest, Posttest, Performance Tasks, and reporting tools

Assessment Guide

Includes a pretest, posttest, performance tasks with assessments, and the answer key for the *Student Guided Practice Book*



Refocus Mini Lesson

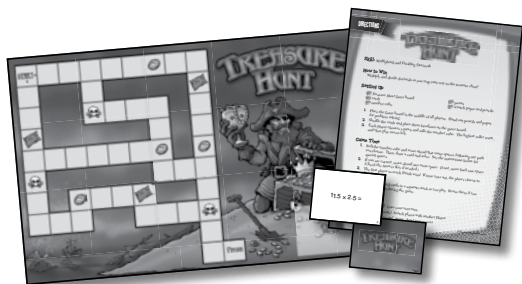


Provide as PowerPoint® and PDF files



3 Math Fluency Game Sets

Include a game board, directions, an answer key, and game pieces

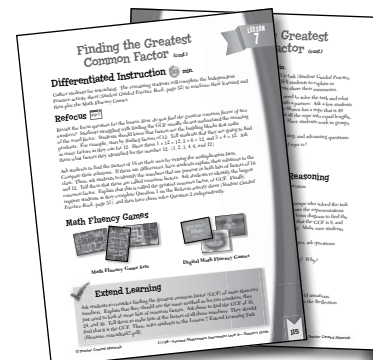
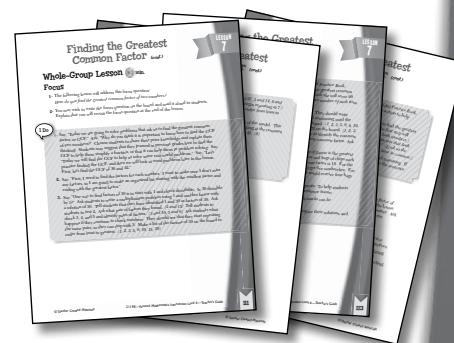
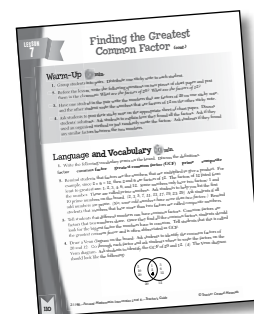
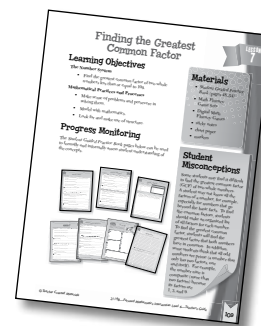


Teaching a Lesson

Teacher's Guide

Each 8-page lesson is organized in a consistent format for ease of use. Teachers may choose to complete some or all of the lesson activities to best meet the needs of their students. Lesson materials can be utilized flexibly in a variety of settings. For example, modeling with a small group, using printed materials with a document camera, or using PDF materials on a digital platform, such as an interactive whiteboard. Each lesson includes:

- an overview page with key information for planning
- key mathematics content standards covered
- key mathematical practices and processes addressed
- an overview providing teacher background or student misconceptions
- a Warm-Up activity to build students' recall of important mathematical concepts
- a whole-class Language and Vocabulary activity
- time markers to indicate the approximate time for instruction
- a whole-class section focusing on the key concept/skill being taught
- use of the gradual release of responsibility model in the Whole-Group lesson section
- differentiation strategies to support and extend learning with the Refocus lesson and Extend Learning activity
- math fluency games that motivate students to develop and reinforce mastery of basic skills
- a Math in the Real World concept task activity

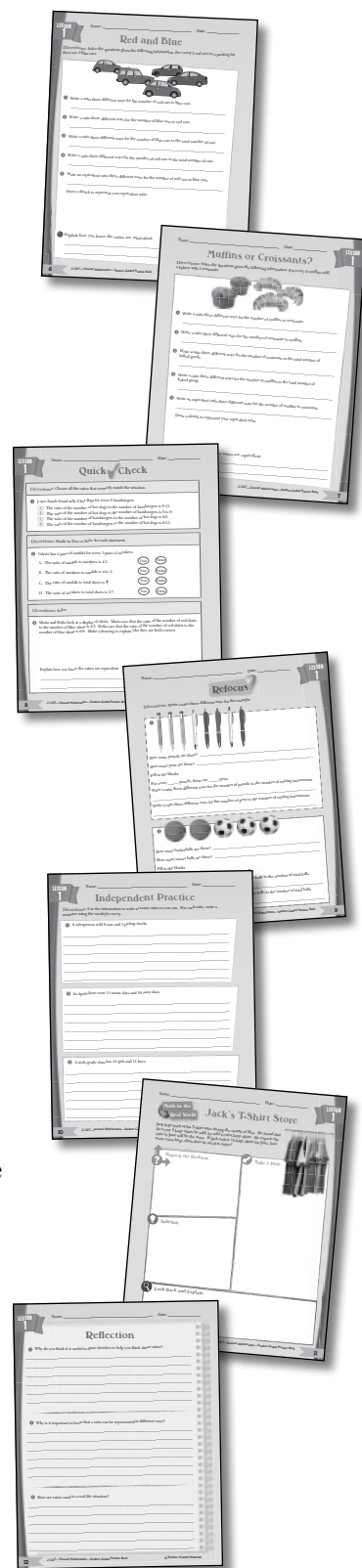


Teaching a Lesson (cont.)

Student Guided Practice Book

Each lesson in the *Teacher's Guide* has seven corresponding student pages in the *Student Guided Practice Book*:

- a We Do activity to support the gradual release of responsibility model
- a You Do activity to facilitate independent practice
- a Quick Check to easily monitor students' progress
- a Refocus activity for students who need more instruction
- an Independent Practice page to reinforce mathematical content taught in the lesson
- a Math in the Real World concept task for students to apply the math concept in a real-life scenario
- a Reflection page for students to share their mathematical understanding



Area of Shapes

Learning Objectives

Geometry

- Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.

Mathematical Practices and Processes

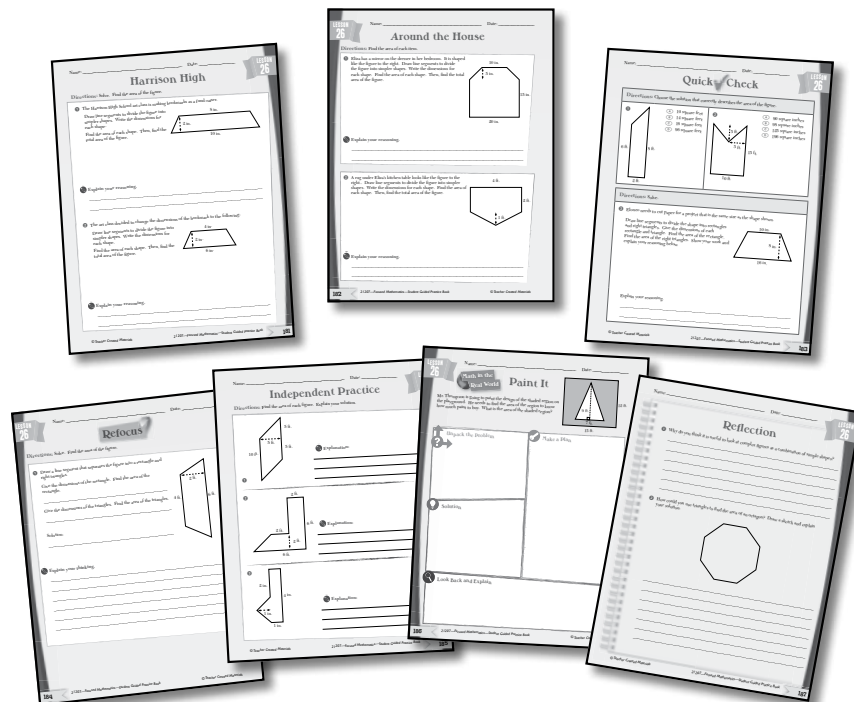
- Make sense of problems and persevere in solving them.
- Construct viable arguments and critique the reasoning of others.
- Use appropriate tools strategically.
- Attend to precision.

Materials

- Student Guided Practice Book* (pages 181–187)
- Math Fluency Game Sets
- Digital Math Fluency Games
- Inch Graph Paper (filename: inchgraph.pdf)
- Rulers (filename: ruler.pdf) or standard rulers
- scissors
- tape

Progress Monitoring

The *Student Guided Practice Book* pages below can be used to formally and informally assess student understanding of the concepts.



Student Misconceptions

Some students may have difficulty decomposing composite figures into common shapes for which formulas can be applied. They may not recognize figures if the orientation of the figure changes. Students should develop strategies for finding the area of various figures and connect that understanding to a more efficient formula.

Area of Shapes (cont.)

Warm-Up (10 min.)

1. Say, "Today we are going to look at the area of figures other than rectangles and right triangles." Divide the students into groups of three. Give each student a sheet of graph paper. Ask each student to draw a rectangle and a right triangle on the graph paper. Then, ask them to find the area of each figure and write it on the figure. Have students cut out the figures.
2. Tell each group to tape their figures together at the edges so that the figures do not overlap. Ask groups to find the area of their combined figures.
3. Ask the groups to show their figures to the class, describing the figures used and the total area.

Language and Vocabulary (10 min.)

1. Write the following vocabulary terms on the board. Discuss the definitions.
quadrilateral trapezoid polygon
2. Point to the word *quadrilateral*. Underline the prefix *quad*. Ask students where they have seen this prefix before. Students may be familiar with quadruplets, quadriceps, and quadrants, all indicating four of something. Circle *lateral*. Students may be familiar with lateral (to the side) passes in football. Ask students to name different kinds of quadrilaterals. (*squares, rectangles, parallelograms, and trapezoids*) Draw a variety of shapes, including concave quadrilaterals (a four-sided figure with an angle that indents) and ask students to identify which are quadrilaterals.
3. Tell students that *poly* in polygon means "many." A polygon is a closed figure with straight sides. Explain that we usually think of regular polygons, in which all the sides are the same length and all the angles have the same measure. Ask students to recall examples of polygons that they know. (*pentagon, hexagon, octagon, etc.*)

Area of Shapes (cont.)

Whole-Group Lesson (40 min.)

Focus

1. The following lesson will address this focus question:
How can you use what you know about finding the area of rectangles and right triangles to help you find the area of more complex figures?
2. You may wish to write the focus question on the board and read it aloud to students. Explain that you will revisit the focus question at the end of the lesson.

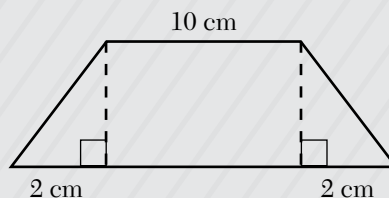
I Do

1. Say, "Today we are going to find the area of some different polygons." Draw an isosceles trapezoid on the board that looks like this:



Ask, "What is the name of this figure?" Students should be encouraged to name the figure in as many ways as possible. (*polygon, quadrilateral, trapezoid, etc.*) Ask which is the most precise name for the figure. (*trapezoid*)

2. Remind students that in the last lesson they used the area of a rectangle to help them find the area of a right triangle. Ask students how they can divide the trapezoid into rectangles and triangles. Let students share their work. If students get stuck, guide them by drawing a straight line from the top left corner to the base. Ask, "What shape did we make? (*triangle*)" Then ask, "Where can we draw another line?" (*from the top right corner to the base*) Ask, "What shapes make up this complex figure?" Students should say a rectangle and two right triangles. Ask, "How can we find the area of the trapezoid?" (*Find the area of the rectangle and two triangles, and add the areas to find the total area.*)
3. Label the figure with the following dimensions:



Area of Shapes *(cont.)*

Whole-Group Lesson *(cont.)*

I Do
(cont.)

4. Point to one of the dashed lines and ask students what it represents. (*the height of the figure*) Label it *5 cm*. Ask, “What is the measure of the height of this trapezoid?” (*5 cm*) Ask students the dimensions of the rectangle. (*5 cm x 10 cm*) Ask them how to find the area of the rectangle. Write *50 square cm* inside the rectangle.
5. Ask students how they can use the given measures to find the area of the triangle. Students may use the formula they learned in the previous lesson, $A = \frac{1}{2}bh$; or use what they know about rectangles to create a rectangle and divide the area in half. Since the base of the triangle is 2 cm and the height is 5 cm, the area of each triangle is 5 cm^2 . Say, “Now that we know the area of each shape, how can we find the area of the complex figure?” (*Add the areas.*) For example, they should add $50 \text{ cm}^2 + 5 \text{ cm}^2 + 5 \text{ cm}^2 = 60 \text{ cm}^2$.

Language Support

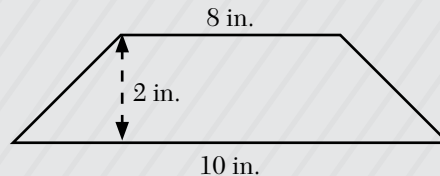
Students may have difficulty remembering all of the terminology for geometric shapes. It may be helpful for students to make a flipbook or mini dictionary that they can refer to. The students can write the word, write an informal definition, and draw a picture or symbol. For example, students can write the word *quadrilateral*, write *a four-sided figure*, and then draw different examples such as a square, rectangle, trapezoid, or rhombus.

Area of Shapes *(cont.)*

Whole-Group Lesson *(cont.)*

We Do

1. Refer students to the Harrison High activity sheet (*Student Guided Practice Book*, page 181). Say, “Let’s look at another example of finding area for complex figures.” Display the figure on the board:



2. Ask, “How can we separate this trapezoid into different shapes?” (*Draw a line from the top right corner down to the base to form a rectangle and two congruent right triangles.*) Ask, “How can we find the area of this complex figure?” (*Find the area of each shape to add the areas together.*)
3. Ask the students to find the dimensions of each shape. Ask them how they can find the base of the triangles. They may suggest to subtract ($10 - 8 = 2$) and share that measurement between the two triangles. Have students find the area of each shape. They should find that the area of the rectangle is 16 in.^2 , and that each triangle has an area of 1 in.^2 .
4. Ask students to find the area of the trapezoid. ($16 \text{ in.}^2 + 1 \text{ in.}^2 + 1 \text{ in.}^2 = 18 \text{ in.}^2$)
5. Refer students back to the problem. To help students explain their reasoning, provide students with the following sentence frame:
 - *To find the total area of the figure, I _____ the _____ of all of the shapes.*
6. Ask students to complete the activity sheet. Ask them to compare their solutions and explanations with other students.

Area of Shapes *(cont.)*

Whole-Group Lesson *(cont.)*

You Do

1. Refer students to the Around the House activity sheet (*Student Guided Practice Book*, page 182). Provide the sentence frame from Step 5 of the We Do section to help students explain their reasoning.
2. Have students share their findings and reasoning. If students have difficulty explaining their reasoning, remind them to use the sentence frame and vocabulary terms.

Closing the Whole-Group Lesson

Revisit the focus question for the lesson: *How can you use what you know about finding the area of rectangles and right triangles to help you find the area of more complex figures?* Students should know that they can separate the figure into simpler shapes, find the area of each shape, and add the areas. Ask students what types of shapes they should divide the figure into. (*rectangles and triangles because the formulas will help find the area of each shape*)

Progress Monitoring 5 min.

1. Have students complete the Quick Check activity sheet (*Student Guided Practice Book*, page 183) to gauge student progress toward mastery of the Learning Objectives.
2. Based on the results of the Quick Check activity sheet and your observations during the lesson, identify students who may benefit from additional instruction in the Learning Objectives. These students will be placed into a small group for reteaching. See instructions on the following page.

Area of Shapes (cont.)

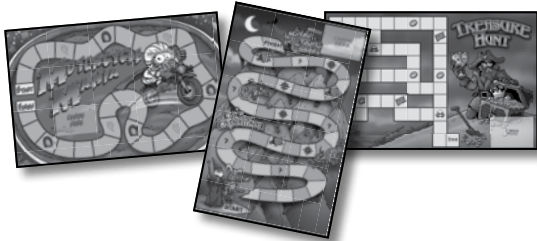
Differentiated Instruction (20 min.)

Gather students for reteaching. The remaining students will complete the Independent Practice activity sheet (*Student Guided Practice Book*, page 185) to reinforce their learning and then play the Math Fluency Games.

Refocus

Revisit the focus question for the lesson: *How can you use what you know about finding the area of rectangles and right triangles to help you find the area of more complex figures?* Students who have difficulty finding the area of complex figures may not be visualizing the rectangles and right triangles they are composed of. These students could benefit from cutting out rectangles and triangles, putting them together in different ways, and drawing an outline. Students can then remove the triangles and rectangles, find the area of each, and replace them on the outline. Students should use 4 in. by 5 in. rectangles, and right triangles with a base and height of 3 in. and 4 in. Using multiple rectangles and triangles will allow students to create many basic shapes. Next, choose a complex figure for the entire class to construct together. Ask students to describe the basic shapes in it, drawing the rectangles and triangles and finding their areas. Ask students to then add the areas to find the area of the complex shape. Guide students to complete Question 1 on the Refocus activity sheet (*Student Guided Practice Book*, page 184), and then have them solve Question 2 independently.

Math Fluency Games



Math Fluency Game Sets



Digital Math Fluency Games



Extend Learning

Ask students how to divide a regular polygon into right triangles. First, draw a regular hexagon. Ask students how to divide it into triangles. Students may initially divide it into six triangles. Then, ask students how to divide each of the six triangles into right triangles. Finally, ask students to identify the number of right triangles. Have students complete the Lesson 26 Extend Learning Task (filename: extendtask26.pdf).

Area of Shapes (cont.)

Math in the Real World (30 min.)

1. Refer students to the Math in the Real World: Paint It task (*Student Guided Practice Book*, page 186). Have a student read the task aloud. Tell students to explain or summarize the task to their partner. Have a few students share their summaries.
2. Ask students to think about what information they will need to solve the task and what the task is asking them to do. Then, have them share with a partner. Ask a few students to share aloud. Students should indicate that they know that Mr. Thompson wants to buy paint to cover the shaded region of the figure. They need to find out how much paint he needs to buy. Have students work in groups of two or three to complete the task.
3. As students are working, circulate and ask focusing, assessing, and advancing questions:
 - *How can you find the area of the triangle and rectangle?*
 - *How can you find the area of the shaded region only?*

Sentence Frames for Explaining Reasoning

- *I know that I need to find the area of the _____ first.*
 - *I can find the area of the rectangle by _____.*
 - *Next, I need to find the area of the _____.*
 - *I can find the area of the shaded figure by _____.*
4. Observe how students are solving the task, and choose a few groups who solved the task in different ways to share their solutions and reasoning. Compare the representations presented. Students should first find the area of the rectangle by multiplying the length and the width. The area of the rectangle is 180 square feet. Next, students should find the area of the triangle by multiplying the base and the height, then dividing it in half. The area of the triangle is 31.5 square feet. To find the area of the shaded region only, the students should subtract the areas. The area of the shaded region is 148.5 ft.². Make sure students explain their reasoning as they share solutions.
 5. As groups are sharing their solution paths, reasoning, and strategies, ask questions:
 - *How can you explain what _____ said in a different way?*
 - *Do you agree or disagree with the solution path and reasoning? Why?*
 - *Which solution path makes the most sense to you? Why?*

Lesson Reflection (5 min.)

Have students summarize their learning about finding area in real-world situations, and provide feedback on any questions they still have about the content on the Reflection activity sheet (*Student Guided Practice Book*, page 187).

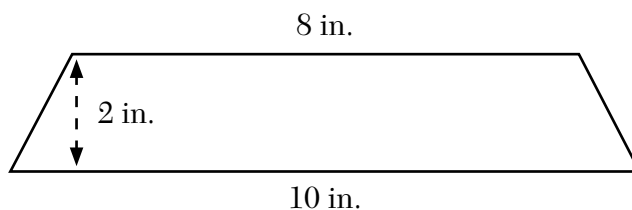
Harrison High

Directions: Solve. Find the area of the figure.

- 1 The Harrison High School art class is making bookmarks as a fund-raiser.

Draw line segments to divide the figure into simpler shapes. Write the dimensions for each shape.

Find the area of each shape. Then, find the total area of the figure.

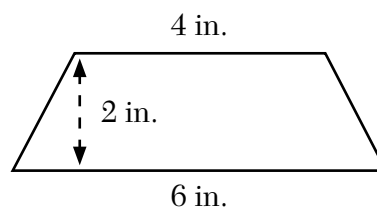


-  Explain your reasoning.

- 2 The art class decided to change the dimensions of the bookmark to the following:

Draw line segments to divide the figure into simpler shapes. Write the dimensions for each shape.

Find the area of each shape. Then, find the total area of the figure.

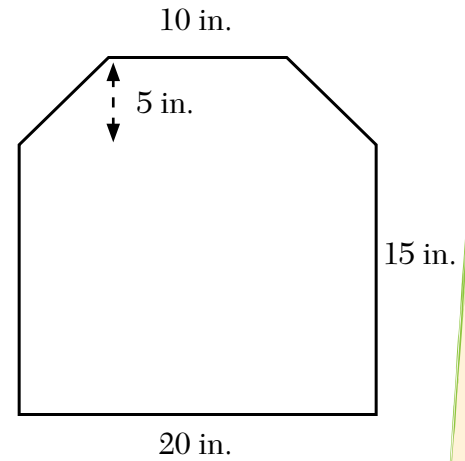


-  Explain your reasoning.

Around the House

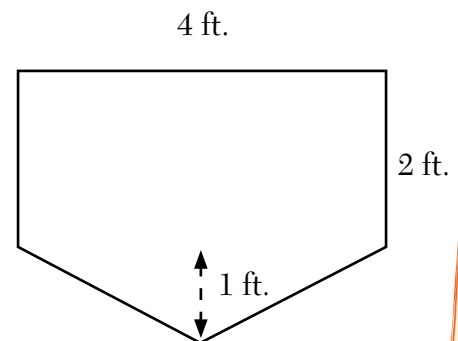
Directions: Find the area of each item.

- 1 Eliza has a mirror on the dresser in her bedroom. It is shaped like the figure to the right. Draw line segments to divide the figure into simpler shapes. Write the dimensions for each shape. Find the area of each shape. Then, find the total area of the figure.



Explain your reasoning.

- 2 A rug under Eliza's kitchen table looks like the figure to the right. Draw line segments to divide the figure into simpler shapes. Write the dimensions for each shape. Find the area of each shape. Then, find the total area of the figure.

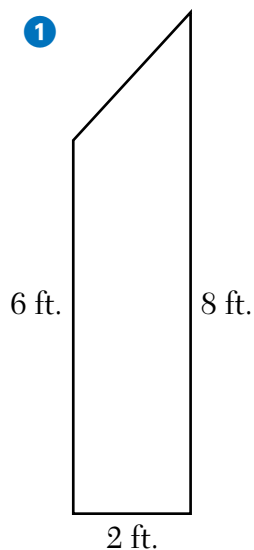


Explain your reasoning.

Quick✓Check

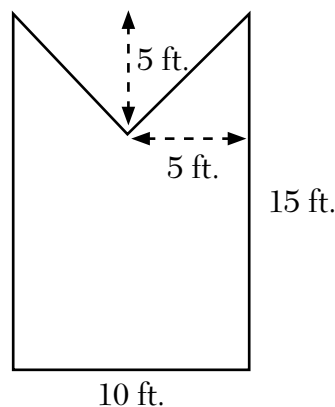
Directions: Choose the solution that correctly describes the area of the figure.

1



- (A) 10 square feet
- (B) 14 square feet
- (C) 16 square feet
- (D) 96 square feet

2

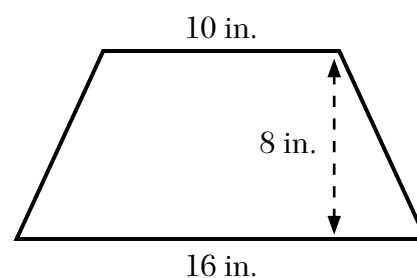


- (A) 90 square inches
- (B) 98 square inches
- (C) 125 square inches
- (D) 196 square inches

Directions: Solve.

- 3** Elonzo needs to cut paper for a project that is the same size as the shape shown.

Draw line segments to divide the shape into rectangles and right triangles. Give the dimensions of each rectangle and triangle. Find the area of the rectangle. Find the area of the right triangles. Show your work and explain your reasoning below.



Explain your reasoning.

Refocus

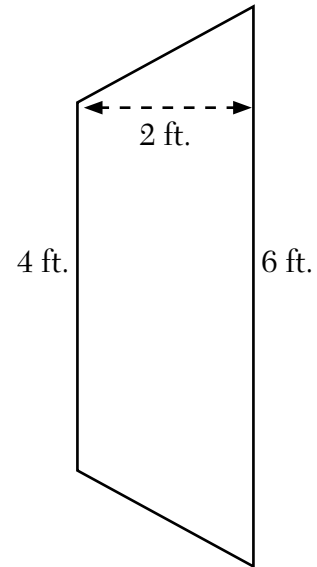
Directions: Solve. Find the area of the figure.

- 1 Draw a line segment that separates the figure into a rectangle and right triangles.

Give the dimensions of the rectangle. Find the area of the rectangle.

Give the dimensions of the triangles. Find the area of the triangles.

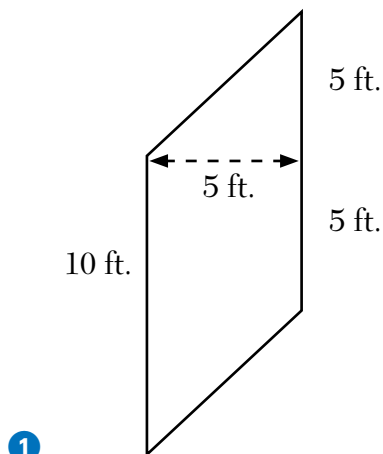
Solution:



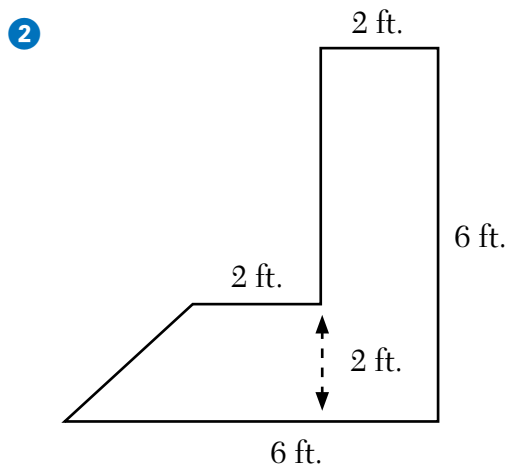
-  Explain your thinking.

Independent Practice

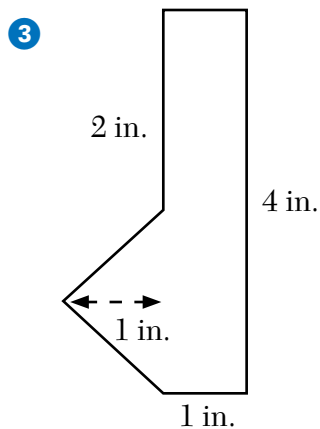
Directions: Find the area of each figure. Explain your solution.



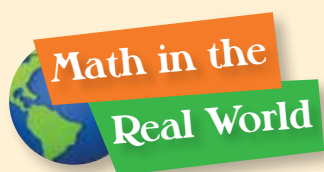
Explanation:



Explanation:

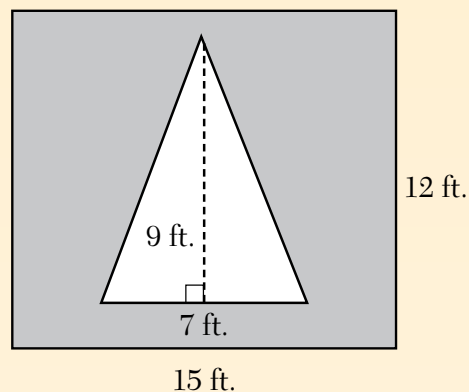


Explanation:



Paint It

Mr. Thompson is going to paint the design of the shaded region on the playground. He needs to find the area of the region to know how much paint to buy. What is the area of the shaded region?



Unpack the Problem



Make a Plan



Solution

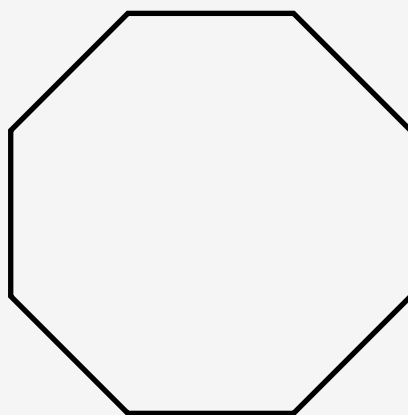


Look Back and Explain

Reflection

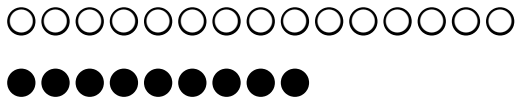
- 1 Why do you think it is useful to look at complex figures as a combination of simple shapes?

- 2 How could you use triangles to find the area of an octagon? Draw a sketch and explain your solution.



Pretest

1. Which expresses the ratio represented by the white and black circles?



- (A)** For every two white circles, there is a black circle.
- (B)** For every six white circles, there are two black circles.
- (C)** For every six white circles, there are four black circles.
- (D)** For every five white circles, there are three black circles.

3. Jeremy ran the 200 meter dash in 40 seconds. What is the unit rate (speed) in meters per second?

- ☐ A 5 m/sec
☐ B 10 m/sec
☒ C 20 m/sec
☐ D 50 m/sec

2. Jackson earns \$15.00 for mowing one lawn. He gets paid the same rate for each lawn he mows. How much will he get paid for mowing 4 lawns? Complete the table and then choose your answer.

Number of Lawns	Total Earnings
1	\$15.00
2	
3	
4	

- Ⓐ \$30.00
- Ⓑ \$45.00
- Ⓒ \$60.00
- Ⓓ \$75.00

4. Mrs. Allen needs about 20 peaches to make 4 peach pies. How many peaches would she need to make 2 pies? Complete the table and then choose your answer.

Peaches				20
Pies	1	2	3	4

- ☐ A 5
- ☐ B 10
- ☐ C 15
- ☐ D 25

Performance Task 1: Founders Day Celebration

Part A

Every year Belleview holds a Founders Day Celebration. Ms. Carter’s sixth-grade class has volunteered to work in City Bakery, which supplies baked goods for Founders Day.

1. The head baker, Mr. Kepke, wants to complete an order form for Founders Day. He says, “I know that last year people bought 3 blueberry muffins for every plain muffin and 4 sweet rolls for every cinnamon roll. People also bought 6 chocolate cupcakes for every 2 vanilla cupcakes.”

Use the chart to write the ratios three different ways for the baked goods sold at last year’s Founders Day Celebration.

Baked Goods Sold	Ratios		
Blueberry Muffins to Plain Muffins			
Sweet Rolls to Cinnamon Rolls			
Chocolate Cupcakes to Vanilla Cupcakes			

2. There are several people working at the bakery today.
- A. Complete the diagram to show that there are 8 bakers for every 2 servers. Provide a legend to explain your diagram.



Bakers: Servers

- B. There are 10 bakers for every 3 custodians. Write the ratio three different ways.
