Problem Solving • Find the Area

Essential Question How can you use the strategy *solve a simpler problem* to solve area problems?

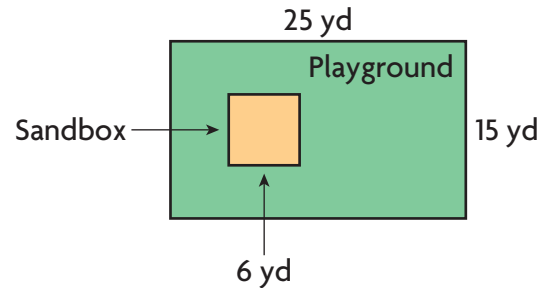Common Core **Measurement and Data—**
4.MD.A.3

MATHEMATICAL PRACTICES
MP1, MP4, MP6

🔑 Unlock the Problem Real World

A landscaper is laying grass for a rectangular playground. The grass will cover the whole playground except for a square sandbox. The diagram shows the playground and sandbox. How many square yards of grass will the landscaper use?

Use the graphic organizer below to solve the problem.

25 yd

Playground

Sandbox →

15 yd

6 yd

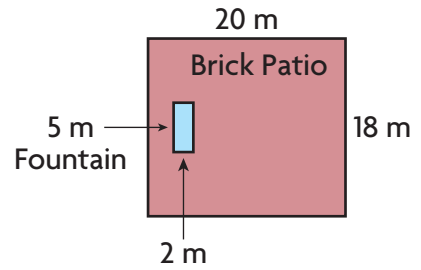| **Read the Problem**	**Solve the Problem**
What do I need to find? I need to find how many _____ the landscaper will use.	First, find the area of the playground. $A = b \times h$ = _____ × _____ = _____ square yards Next, find the area of the sandbox. $A = s \times s$ = _____ × _____ = _____ square yards
What information do I need to use? The grass will cover the _____. The grass will not cover the _____. The length and width of the playground are _____ and _____. The side length of the square sandbox is _____.	Last, subtract the area of the sandbox from the area of the playground. $\begin{array}{r} 375 \\ -\ \ 36 \\ \hline \end{array}$ _____ square yards
How will I use the information? I can solve simpler problems. Find the area of the _____. Find the area of the _____. Then _____ the area of the _____ from the area of the _____.	So, the landscaper will use _____ _____ of grass to cover the playground. **Math Talk** **MATHEMATICAL PRACTICES ❶** **Make Sense of Problems** How did the strategy help you solve the problem?

🔑 Try Another Problem

Zach is laying a rectangular brick patio for a new museum. Brick will cover the whole patio except for a rectangular fountain, as shown in the diagram. How many square meters of brick does Zach need?

20 m

Brick Patio

5 m → | Fountain

18 m

2 m

Read the Problem	Solve the Problem
What do I need to find?	
What information do I need to use?	
How will I use this information?	

• How many square meters of brick does Zach need? Explain.

_____

_____

_____

Name _____

Share and Show | MATH BOARD

Unlock the Problem

✓ Use the Problem Solving MathBoard
✓ Underline important facts.
✓ Choose a strategy you know.

1. Lila is wallpapering one wall of her bedroom, as shown in the diagram. She will cover the whole wall except for the doorway. How many square feet of wall does Lila need to cover?

First, find the area of the wall.

$A = b \times h$

   = _____ × _____

   = _____ square feet

Next, find the area of the door.

$A = b \times h$

   = _____ × _____

   = _____ square feet

Last, subtract the area of the door from the area of the wall.

_____ − _____ = _____ square feet

So, Lila needs to cover _____ of wall.

2. What if there was a square window on the wall with a side length of 2 feet? How much wall would Lila need to cover then? Explain.

_____

_____

_____

3. Ed is building a model of a house with a flat roof, as shown in the diagram. There is a chimney through the roof. Ed will cover the roof with square tiles. If the area of each tile is 1 square inch, how many tiles will he need? Explain.
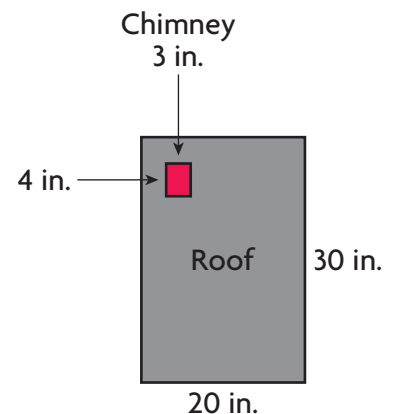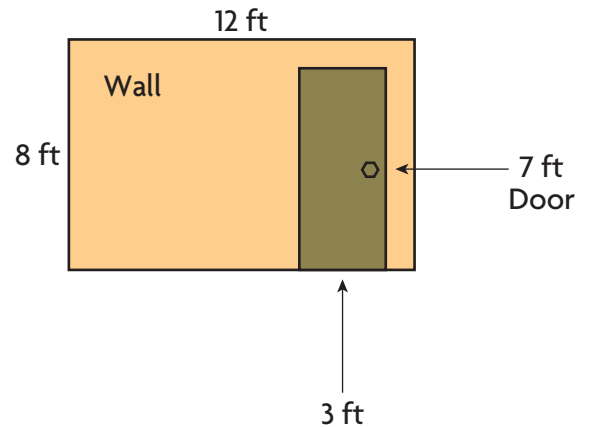
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Chapter 13 • Lesson 5   745

On Your Own

4. **MATHEMATICAL PRACTICE ①** **Make Sense of Problems** Lia has a dog and a cat. Together, the pets weigh 28 pounds. The dog weighs 3 times as much as the cat. How much does each pet weigh?

_____

5. **THINK SMARTER** Mr. Foster is covering two rectangular pictures with glass. One is 6 inches by 4 inches and the other one is 5 inches by 5 inches. Does he need the same number of square inches of glass for each picture? Explain.

_____

_____

6. **GO DEEPER** Claire says the area of a square with a side length of 100 centimeters is greater than the area of a square with a side length of 1 meter. Is she correct? Explain.

_____

_____

_____

WRITE ▸ *Math*
Show Your Work

7. **THINK SMARTER** A rectangular floor is 12 feet long and 11 feet wide. Janine places a rug that is 9 feet long and 7 feet wide and covers part of the floor in the room. Select the word(s) to complete the sentence.

To find the number of square feet of the floor that is NOT covered by the rug,

| add | area of the rug | from |
| subtract | the length of the rug | by | the area of the floor. |
| multiply | area of the floor | to |

Problem Solving • Find the Area

Common Core **COMMON CORE STANDARD—4.MD.A.3**
*Solve problems involving measurement and
conversion of measurements from a larger unit
to a smaller unit.*

Solve each problem.

1. A room has a wooden floor. There is a rug in
   the center of the floor. The diagram shows
   the room and the rug. How many square
   feet of the wood floor still shows?
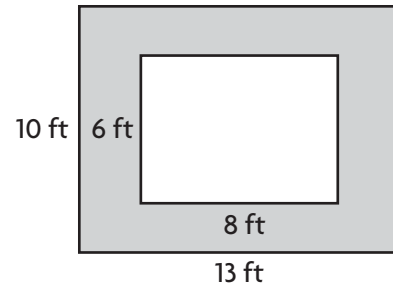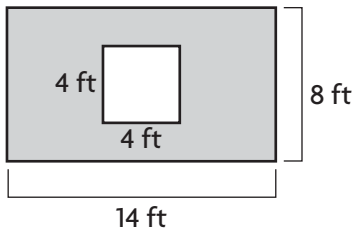
   <u>**82 square feet**</u>

   Area of the floor: $13 \times 10 = 130$ square feet
   Area of the rug: $8 \times 6 = 48$ square feet
   Subtract to find the area of the floor still showing: $130 - 48 = 82$ square feet

   10 ft 6 ft
   8 ft
   13 ft

2. A rectangular wall has a square window, as
   shown in the diagram.

   4 ft
   4 ft
   8 ft
   14 ft

   What is the area of the wall NOT including
   the window?

3. Bob wants to put down new sod in his
   backyard, except for the part set aside for
   his flower garden. The diagram shows Bob's
   backyard and the flower garden.

   14 yd
   9 yd
   5 yd
   20 yd
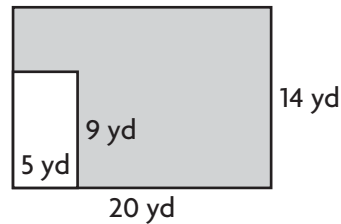
   How much sod will Bob need?

4. A rectangular painting is 24 inches wide and
   20 inches tall without the frame. With the
   frame, it is 28 inches wide and 24 inches tall.
   What is the area of the frame not covered by
   the painting?

5. **WRITE** ▸*Math* Suppose you painted the
   walls of your classroom. Describe how to
   find the area of the walls that are painted.

Lesson Check _(4.MD.A.3)

1. One wall in Zoe's bedroom is 5 feet wide and 8 feet tall. Zoe puts up a poster of her favorite athlete. The poster is 2 feet wide and 3 feet tall. How much of the wall is not covered by the poster?

2. A garage door is 15 feet wide and 6 feet high. It is painted white, except for a rectangular panel 1 foot high and 9 feet wide that is brown. How much of the garage door is white?

Spiral Review _(4.OA.B.4, 4.NF.A.2, 4.MD.A.2, 4.MD.A.3)

3. Kate made a box to hold her jewelry collection. She used 42 inches of wood to build the sides of the box. If the box was 9 inches wide, how long was the box?

4. Larry, Mary, and Terry each had a full glass of juice. Larry drank $\frac{3}{4}$ of his. Mary drank $\frac{3}{8}$ of hers. Terry drank $\frac{7}{10}$ of his. Who drank less than $\frac{1}{2}$ of their juice?

5. List all of the numbers between 20 and 30 that are prime.

6. Tom and some friends went to a movie. The show started at 2:30 P.M. and ended at 4:15 P.M. How long did the movie last?

**FOR MORE PRACTICE
GO TO THE
Personal Math Trainer**