Topic B

Concepts of Area Measurement

3.MD.5, 3.MD.6, 3.MD.7

**Focus Standards:**

3.MD.5 Recognize area as an attribute of plane figures and understand concepts of area measurement.
   a. A square with side length 1 unit, called “a unit square,” is said to have “one square unit” of area, and can be used to measure area.
   b. A plane figure which can be covered without gaps or overlaps by \( n \) unit squares is said to have an area of \( n \) square units.

3.MD.6 Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).

3.MD.7 Relate area to the operations of multiplication and addition.
   a. Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.
   b. Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.
   d. Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.

**Instructional Days:** 4

**Coherence - Links from:**

G2–M2 Addition and Subtraction of Length Units
G3–M1 Properties of Multiplication and Division and Solving Problems with Units of 2–5 and 10
G3–M3 Multiplication and Division with Units of 0, 1, 6–9, and Multiples of 10

**Links to:**

G4–M3 Multi-Digit Multiplication and Division
G4–M7 Exploring Multiplication

In previous lessons, students tiled given rectangles. In Lesson 5, students build rectangles using unit square tiles to make arrays when given specific criteria. For example, students may be told that there are 24 tiles inside the rectangle and that one side of the rectangle is covered with 4 tiles. Students may start by building one column of the array to represent a length of 4 units, then duplicate that process until they reach 24 total tiles, skip-counting by fours. Finally they physically push together the rows of tiles to make the array. When they count the number of fours, the process connects to unknown factor problems (in this case, the unknown factor of 6) from previous modules and builds toward students’ discovery of the area formula.

Now experienced with drawing rectangular arrays within an area model, students find the area of an
incomplete array in Lesson 6. They visualize and predict what the finished array looks like, then complete it by joining opposite end points with a straight edge and determine the total area using skip-counting. The incomplete array model bridges to the area model, where no array is given.

In Lesson 7, students are given information about the side lengths of an area model (shown at right). Based on this information they use a straight edge to draw a grid of equal sized squares within the area model, then skip-count to find the total number of squares. Units move beyond square centimeters and inches to include square feet and square meters.

In Lesson 8, students recognize that side lengths play an important part in determining the area of a rectangle. They understand that multiplying the number of square units in a row by the number of rows produces the same result as skip-counting the squares within the array. Given the area and one side length, students realize that they can use multiplication with an unknown factor or division to find the unknown side length.

A Teaching Sequence Towards Mastery of Concepts of Area Measurement

**Objective 1:** Form rectangles by tiling with unit squares to make arrays.
(Lesson 5)

**Objective 2:** Draw rows and columns to determine the area of a rectangle, given an incomplete array.
(Lesson 6)

**Objective 3:** Interpret area models to form rectangular arrays.
(Lesson 7)

**Objective 4:** Find the area of a rectangle through multiplication of the side lengths.
(Lesson 8)
Lesson 5

Objective: Form rectangles by tiling with unit squares to make arrays.

Suggested Lesson Structure

- Fluency Practice (14 minutes)
- Application Problem (6 minutes)
- Concept Development (30 minutes)
- Student Debrief (10 minutes)
- Total Time (60 minutes)

**Fluency Practice (14 minutes)**

- Group Counting 3.OA.1 (3 minutes)
- Products in an Array 3.OA.3 (3 minutes)
- Find the Common Products 3.OA.7 (8 minutes)

**Group Counting (3 minutes)**

Note: Group counting reviews interpreting multiplication as repeated addition.

Direct students to count forward and backward, occasionally changing the direction of the count.

- Threes to 30
- Sixes to 60
- Sevens to 70
- Nines to 90

**Products in an Array (3 minutes)**

Materials: (S) Personal white boards

Note: This fluency anticipates relating multiplication with area in G3–M4–Topic B.

T: (Project an array with 4 rows of 3 stars.) How many rows of stars do you see?
S: 4 rows.
T: How many stars are in each row?
S: 3 stars.
T: On your boards, write two multiplication sentences that can be used to find the total number of stars.
Lesson 5: Form rectangles by tiling with unit squares to make arrays.

Date: 9/30/13

Find the Common Products (8 minutes)

Materials: (S) Blank paper

Note: This fluency reviews multiplication patterns from G3–Module 3.

T: (List the multiples of 4 and 8.) Draw a line to match the numbers that appear in both columns.

S: (Match 8, 16, 24, 32, and 40.)

T: (Write \(2 \times 4 = 8\), etc., next to each matched number on the left half of the paper.) Write the rest of the number sentences like I did.

T: (Write \(8 = 1 \times 8\), etc., next to each matched number on the right half of the paper.) Write the rest of the equations like I did.

S: (Write equations.)

T: (Write \(4 \times 2 = \_ \times 8\.) Say the true equation.

S: \(2 \times 4 = 1 \times 8\).

T: (Write \(2 \times 4 = 1 \times 8\.) Write the remaining equal facts as equations.

S: (Write \(4 \times 4 = 2 \times 8, 6 \times 4 = 3 \times 8, 8 \times 4 = 4 \times 8, 10 \times 4 = 5 \times 8\.)

T: Discuss the patterns in your equations.

S: Each multiple of 8 is also a multiple of 4.

Application Problem (6 minutes)

Candice uses square-centimeter tiles to find the side lengths of a rectangle as shown. She says the side lengths are 5 centimeters and 7 centimeters. Her partner, Luis uses a ruler to check Candice’s work and says that the side lengths are 5 centimeters and 6 centimeters. Who is right? How do you know?

Candice is right because she used square centimeter tiles to find the side lengths and when I counted the tiles there were 5 on one side and 7 on the other side. That means that the side lengths are 5 cm and 7 cm.
Note: This problem reviews G3–M4–Lesson 4, specifically the relationship between the number of tiles and the side length. Invite the students to discuss what Luis might have done wrong.

**Concept Development (30 minutes)**

Materials: (S) 15 square-inch tiles per student, personal white board, straight edge, blank paper

**Concrete: Understand the relationship between side lengths and area.**

(Draw or project the rectangle and side length shown to the right.)

T: Use square-inch tiles to show this rectangle as an array. What information do we know?

S: There are 2 rows. \( \rightarrow \) A side length is 2 inches.

T: At your table, place tiles to make the known side.

S: (Make 1 column of 2 tiles.)

T: (Write below the diagram: \( \text{Area} = 12 \text{ sq in.} \)) How many total tiles will we use to make our rectangle?

S: 12 tiles.

T: How many twos are in 12?

S: 6 twos.

T: Use your tiles to make 6 twos, then skip-count to check your work.

S: (Make 6 groups of 2 tiles and skip-count.) 2, 4, 6, 8, 10, 12.

T: Push your twos together to make a rectangle. (After students do so, add a question mark to the diagram as shown at right.) What is the unknown side length?

S: Six. \( \rightarrow \) Six tiles. \( \rightarrow \) Six inches.

T: (Replace the question mark with 6 in on the diagram.) Tell your partner about the relationship between the side lengths and the area. Write an equation to show your thinking. Be sure to include the units.

S: 2 inches \( \times \) 6 inches \( = \) 12 square inches, so the area is the product of the side lengths. (Write 2 in \( \times \) 6 in \( = \) 12 sq in.)

Repeat the process using a rectangle with a known side length of 5 inches and an area of 15 square inches. Ask students to write an unknown factor problem, 5 \( \times \) ___ \( = \) 15, then use the tiles to solve.
Concrete/Pictorial: Form rectangles and determine area or side lengths by drawing to make arrays.

T: Lay tiles on your personal board to make a side 3 inches tall. Trace the outline of all 3 tiles. Then, draw horizontal lines to show where they connect.
S: (Draw image shown at right.)
T: Label the side length.
S: (Label 3 in, as shown.)
T: Use your tiles to make another side, 7 inches long.
S: (Add tiles horizontally, using the corner tile as one of the 7.)
T: Trace the outline of the tiles. Draw vertical lines to show where they connect. Label the side length.
S: (Drawing shown to the right, label 7 in as shown.)
T: How many threes will be in this rectangle?
S: 7 threes.
T: Talk to your partner. Which strategy might you use to find the total area of the rectangle?
S: We can draw in the rest of the squares and count them all. \(\Rightarrow\) Or, just skip-count 7 threes. \(\Rightarrow\) It would be easier to just multiply 7 inches \(\times\) 3 inches and get 21 square inches.
T: Many students suggested multiplying the side lengths to find the area. Let’s check this strategy by drawing in the rest of squares. Use your straight edge to draw the rest of the tiles in the rectangle, then skip-count to find the total area.
S: (Follow the grid lines to make the other tiles, then skip-count.) 3, 6, 9, 12, 15, 18, 21.
T: Does 7 inches \(\times\) 3 inches = 21 square inches accurately give the area of the rectangle?
S: Yes!
T: Clear your board and use your tiles to make a side length of 6 inches. Trace the outline of all 6 tiles. Then draw horizontal lines to show where they connect.
S: (Draw image shown at right.)
T: Label the side length.
S: (Label 6 in, as shown.)
T: Write 6 \(\times\) ___ = 24 on your board. Talk to a partner, how can you use this equation to help you find the other side length?
S: From the equation, I know that the area is 24, so I can add rows of 6 tiles until I have 24 tiles. Then, I can count the rows to find the side length. \(\Rightarrow\) I can skip-count by 6 to get to 24, and then I know the other side length will be equal to the number of times I skip-count. \(\Rightarrow\) I know 6 \(\times 4 = 24\), so I know that the other side length is 4.
T: Choose a strategy to find the other side length and then fill in the blank in the equation. (Allow time for students to work.) What is the other side length?
S: 4 inches!
Problem Set (10 minutes)

Students should do their personal best to complete the Problem Set within the allotted 10 minutes. For some classes, it may be appropriate to modify the assignment by specifying which problems they work on first. Some problems do not specify a method for solving. Students solve these problems using the RDW approach used for Application Problems.

Student Debrief (10 minutes)

Lesson Objective: Form rectangles by tiling with unit squares to make arrays.

The Student Debrief is intended to invite reflection and active processing of the total lesson experience.

Invite students to review their solutions for the Problem Set. They should check work by comparing answers with a partner before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed in the Debrief. Guide students in a conversation to debrief the Problem Set and process the lesson.

You may choose to use any combination of the questions below to lead the discussion.

- Compare Problems 1(b) and 1(e), and Problems 1(a) and 1(c). How does each pair show commutativity?
- How many more threes does the array in Problem 1(d) have than the array in Problem 1(a)? How might the side lengths help you know that, even without seeing the tiled array?
- Compare Problems 1(c) and 1(f). How are the areas related? (The area of 1(f) is half the area of 1(c).) How might you have figured that out just by knowing the side lengths of each array?
- Students may have different solutions for Problem 3. Invite them to share and compare their work.
- In Problem 2, what strategy did you use to find the unknown side length? Is there another way you could have figured it out?
Exit Ticket (3 minutes)

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help you assess the students’ understanding of the concepts that were presented in the lesson today and plan more effectively for future lessons. You may read the questions aloud to the students.

Form rectangles by tiling with unit squares to make arrays.

2. Lindsey makes a rectangle with 15 square inch tiles. She arranges the tiles in 5 equal rows. What are the side lengths of the rectangle? Use words, pictures and numbers to support your answer.

3. Mark has a total of 24 square inch tiles. He uses 8 square inch tiles to build one rectangular array. He uses one remaining square inch tile to build a second rectangular array. Show two arrays that Mark might have made. Then write multiplication sentences for each.

4. Lammata makes a rectangle with 20 square centimeter tiles. There are 4 equal rows of tiles.
   a. How many tiles are in each row? Use words, pictures and numbers to support your answer.
   b. Can Lammata arrange all of her 20 square centimeter tiles into the new rectangular array? Explain your answer.

© 2013 Common Core, Inc. Some rights reserved. commoncore.org

This work is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported License.
Lesson 5 Problem Set

1. Use the centimeter side of a ruler to draw in the tiles, then skip-count to find the unknown side length or area. Write a multiplication sentence for each tiled rectangle.

   a. Area: 18 square centimeters.

   ![Diagram of 3 cm by 6 cm rectangle]

   \[3 \times ____ = 18\]

   b. Area: ____ square centimeters.

   ![Diagram of 4 cm by 5 cm rectangle]

   ____ \times ____ = ____

   c. Area: 18 square centimeters.

   ![Diagram of 6 cm by 6 cm rectangle]

   ____ \times ____ = ____

   d. Area: 24 square centimeters.

   ![Diagram of 3 cm by 8 cm rectangle]

   _____ \times _____ = _____

   e. Area: 20 square centimeters.

   ![Diagram of 5 cm by 4 cm rectangle]

   _____ \times _____ = _____

   f. Area: ____ square centimeters.

   ![Diagram of 3 cm by 6 cm rectangle]

   _____ \times _____ = _____
2. Lindsey makes a rectangle with 35 square-inch tiles. She arranges the tiles in 5 equal rows. What are the side lengths of the rectangle? Use words, pictures, and numbers to support your answer.

3. Mark has a total of 24 square-inch tiles. He uses 18 square-inch tiles to build one rectangular array. He uses the remaining square-inch tiles to build a second rectangular array. Draw two arrays that Mark might have made. Then write multiplication sentences for each.

4. Leon makes a rectangle with 32 square-centimeter tiles. There are 4 equal rows of tiles.
   a. How many tiles are in each row? Use words, pictures, and numbers to support your answer.
   b. Can Leon arrange all of his 32 square-centimeter tiles into 6 equal rows? Explain your answer.
Darren has a total of 28 square-centimeter tiles. He arranges them into 7 equal rows. Draw Darren’s rectangle. Label the side lengths, and write a multiplication equation to find the total area.
Lesson 5: Form rectangles by tiling with unit squares to make arrays

Name _________________________________ Date __________________________

1. Use the centimeter side of a ruler to draw in the tiles, then skip-count to find the unknown side length or area. Write a multiplication sentence for each tiled rectangle.

   a. Area: **24** square centimeters.

   ![Rectangle](image)

   \[4 \times \_ \_ \_ = 24\]

   b. Area: **24** square centimeters.

   ![Rectangle](image)

   \[\_ \_ \_ \times \_ \_ \_ = \_ \_ \_\]

   c. Area: **15** square centimeters.

   ![Rectangle](image)

   \[\_ \_ \_ \times \_ \_ \_ = \_ \_ \_\]

   d. Area: **15** square centimeters.

   ![Rectangle](image)

   \[\_ \_ \_ \times \_ \_ \_ = \_ \_ \_\]
2. Ally makes a rectangle with 45 square-inch tiles. She arranges the tiles in 5 equal rows. How many square-inch tiles are in each row? Use words, pictures, and numbers to support your answer.

3. Leon makes a rectangle with 36 square-centimeter tiles. There are 4 equal rows of tiles.
   a. How many tiles are in each row? Use words, pictures, and numbers to support your answer.
   b. Can Leon arrange all of his 36 square-centimeter tiles into 6 equal rows? Use words, pictures, and numbers to support your answer.
   c. Do the rectangles in (a) and (b) have the same total area? Explain how you know.
Lesson 6

Objective: Draw rows and columns to determine the area of a rectangle, given an incomplete array.

Suggested Lesson Structure

- Fluency Practice (12 minutes)
- Application Problem (8 minutes)
- Concept Development (30 minutes)
- Student Debrief (10 minutes)

Total Time (60 minutes)

Fluency Practice (12 minutes)

- Group Counting 3.OA.1 (4 minutes)
- Write the Multiplication Fact 3.MD.7 (4 minutes)
- Products in an Array 3.OA.3 (4 minutes)

Group Counting (4 minutes)

Note: Group counting reviews interpreting multiplication as repeated addition.

Direct students to count forward and backward, occasionally changing the direction of the count.

- Sixes to 60
- Sevens to 70
- Eights to 80
- Nines to 90

Write the Multiplication Fact (4 minutes)

Materials: (S) Personal white boards

Note: This fluency reviews relating multiplication with area from G3–M4–Lesson 5.

T: (Project a 5 by 3 square-unit tiled rectangle. Write ____ x ____ = 15.) There are 15 tiles altogether. How many rows are there?
S: 5 rows.
T: (Write 5 x ____ = 15.) On your boards, fill in the blank to make a true equation.
S: (Write 5 x 3 = 15.)
Lesson 6: Draw rows and columns to determine the area of a rectangle, given an incomplete array.

Date: 10/1/13

4.B.15

NOTES ON MULTIPLE MEANS OF ENGAGEMENT:
Adjust the numbers in the Application Problem to challenge students working above grade level.

T: (Project a 3 by 4 square-unit tiled rectangle. Write \( \_ \times \_ = 12 \).) There are 12 tiles altogether. How many columns are there?
S: 4 columns.
T: (Write \( \_ \times 4 = 12 \).) On your boards, fill in the blank to make a true equation.
S: (Write \( 3 \times 4 = 12 \).

Continue with the following possible sequence, asking the students to first name either the number of rows or the number of columns: 4 by 6, 6 by 7, 5 by 8, and 7 by 8.

Products in an Array (4 minutes)

Materials: (S) Personal white boards

Note: This fluency supports the relationship between multiplication and area.

T: (Project an array with 2 rows of 6 stars.) How many rows of stars do you see?
S: 2 rows.
T: How many stars are in each row?
S: 6 stars.
T: On your boards, write two multiplication sentences that can be used to find the total number of stars.
S: (Write \( 2 \times 6 = 12 \) and \( 6 \times 2 = 12 \).

Continue with the following possible sequence: 3 by 7, 6 by 5, 8 by 6, and 4 by 9.

Application Problem (8 minutes)

Huma has 4 bags of square-inch tiles with 6 tiles in each bag. She uses them to measure the area of a rectangle on her homework. After covering the rectangle, Huma has 4 tiles left. What is the area of the rectangle?

<table>
<thead>
<tr>
<th>6</th>
<th>6</th>
<th>6</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>( n \times 6 = n )</td>
<td>4 \times 6 = 24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( n = \text{total number of Huma's tiles} )</td>
<td>( c = \text{number of tiles left} )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( c \times 4 = 24 - 4 = c )</td>
<td>( c = 20 )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \frac{24 - 4}{c} = \text{number of tiles used to cover the rectangle} )</td>
<td>The area of the rectangle is 20 sq. inches</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: This problem reviews multi-step word problems in the context of using square tiles to measure area.
Concept Development (30 minutes)

Materials: (S) Personal white board, straight edge, Problem Set, array template

Part 1: Estimate to draw the missing square units inside an array.

Students have the array template in their personal boards, looking at Array 1.

T: How can an array of square units help you find the area of a rectangle?
S: You can count the total number of square units inside the rectangle. → You can skip-count the rows to find the total.

T: (Project or display the image at right.) What do you notice about the array inside of this rectangle?
S: Some of the square units are missing.
T: What do you notice about the top row?
S: It has 4 square units and a rectangle.
T: Look at the second row. Can you use those square units to help you know how many square units make the top row?
S: The second row has 1 more square unit than the top row. You can just follow the line it makes to divide the rectangle into 2 square units.
T: Use your straight edge to draw that line now.
S: (Draw as shown at right.)
T: Talk to your partner: Use the top row to figure out how many square units will fit in each of the rows below. How do you know?
S: Each row should have 6 square units, because rows in an array are equal!
T: Use the lines that are already there as guides, and with your straight edge, draw lines to complete the array.
S: (Draw.)
T: How many rows of 6 are in this array?
S: 4 rows of 6.
T: What equation can be used to find the area of the rectangle?
S: $4 \times 6 = 24$. 

NOTES ON MULTIPLE MEANS FOR ACTION AND EXPRESSION:

Scaffold the following sequence further by beginning with a basic 2 by 2 rectangle in which 2 tiles are missing. Graduate to a 2 by 3 rectangle in which tiles or lines are missing. Continue step by step until students are ready for rectangles with larger areas. Also consider adding color to alternating tiles to assist counting or to distinguish tiles from rectangles or blank space.
Part 2: Draw rows and columns to determine the area.

T: (Project the rectangle shown at right.) Turn your array template over. Can we estimate to draw unit squares inside the rectangle?
S: Yes.
T: It might take us longer, because fewer units are given. A quicker way to find the area is to figure out the number of rows and the number of columns. Let’s start by finding the number of rows in our array. How can we find the number of rows?
S: The first column shows you how many rows there are.
T: With your finger, show your partner what you’ll draw to find the number of rows. Then draw.
S: (Show and draw.)
T: How can we find the number of columns?
S: The first row shows you how many columns there are.
T: Use your straight edge to complete the first row. Label the side lengths of the rectangle, including units.
S: (Draw and label side lengths 5 units and 6 units.)
T: What number sentence can be used to find the area?
S: 5 × 6 = 30.

Problem Set (10 minutes)

Students should do their personal best to complete the Problem Set within the allotted 10 minutes. For some classes, it may be appropriate to modify the assignment by specifying which problems they work on first. Some problems do not specify a method for solving. Students solve these problems using the RDW approach used for Application Problems.

Student Debrief (10 minutes)

Lesson Objective: Draw rows and columns to determine the area of a rectangle, given an incomplete array.

The Student Debrief is intended to invite reflection and active processing of the total lesson experience. Invite students to review their solutions for the Problem Set. They should check work by comparing answers with a partner before going over answers as a class. Look for
misconceptions or misunderstandings that can be addressed in the Debrief. Guide students in a conversation to debrief the Problem Set and process the lesson.

You may choose to use any combination of the questions below to lead the discussion:

- How did you know where to draw the columns and rows in Problem 1?
- To find area, why don’t we need to draw all of the square units in an incomplete array?
- What mistake did Sheena make in Problem 2?
- Is it necessary to have the rug to solve Problem 3? Why or why not?
- In Problem 3, how many tiles does the rug touch?
- There are multiple ways to find a solution to Problem 4. Invite students to share how they found the answer.

**Exit Ticket (3 minutes)**

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help you assess the students’ understanding of the concepts that were presented in the lesson today and plan more effectively for future lessons. You may read the questions aloud to the students.
Lesson 6: Draw rows and columns to determine the area of a rectangle, given an incomplete array.

Date: 10/1/13

1. Each square represents a 1-cm square. Draw to find the number of rows and columns in each array. Match it to its completed array. Then fill in the blanks to make a true equation to find each array's area.

   a. 
   
   
   
   b. 
   
   
   c. 
   
   
   d. 
   
   
   e. 
   
   
   f. 
   

   _____ × _____ = _____ sq cm
   _____ × _____ = _____ sq cm
   _____ × _____ = _____ sq cm
   _____ × _____ = _____ sq cm
   _____ × _____ = _____ sq cm
   _____ × _____ = _____ sq cm
2. Sheena skip-counts by sixes to find the total square units in the rectangle below. She says there are 42 square units. Is she right? Explain your answer.

[Diagram of a rectangle with an incomplete array]

3. The tile floor in Brandon’s living room has a rug on it as shown below. How many square tiles are on the floor, including the tiles under the rug?

[Diagram of a rectangular floor with a rug]

4. Abdul is creating a stained glass window with square-inch glass tiles as shown below. How many more square-inch glass tiles does Abdul need to finish his glass window? Explain your answer.

[Diagram of a stained glass window]
Name ___________________________________________  Date _______________________

The tiled floor in Cayden’s dining room has a rug on it as shown below. How many square tiles are on the floor, including the tiles under the rug?
Lesson 6: Draw rows and columns to determine the area of a rectangle, given an incomplete array.

Name ____________________________ Date ______________

1. Each □ represents a 1-cm square. Draw to find the number of rows and columns in each array. Match it to its completed array. Then fill in the blanks to make a true equation to find each array’s area.

   a. 

   b. 

   c. 

   d. 

   e. 

   f. 

   ____ × ____ = ____ sq cm

   ____ × ____ = ____ sq cm

   ____ × ____ = ____ sq cm

   ____ × ____ = ____ sq cm

   ____ × ____ = ____ sq cm

   ____ × ____ = ____ sq cm
2. Minh skip-counts by sixes to find the total square units in the rectangle below. She says there are 36 square units. Is she correct? Explain your answer.

3. The tub in Paige’s bathroom covers the tile floor as shown below. How many square tiles are on the floor, including the tiles under the tub?

Array 1

Draw rows and columns to determine the area of a rectangle, given an incomplete array.

Date: 10/1/13
Lesson 6: Draw rows and columns to determine the area of a rectangle, given an incomplete array.

Date: 10/1/13

Array 2
Lesson 7

Objective: Interpret area models to form rectangular arrays.

Suggested Lesson Structure

<table>
<thead>
<tr>
<th>Activity</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluency Practice</td>
<td>12 minutes</td>
</tr>
<tr>
<td>Application Problem</td>
<td>8 minutes</td>
</tr>
<tr>
<td>Concept Development</td>
<td>30 minutes</td>
</tr>
<tr>
<td>Student Debrief</td>
<td>10 minutes</td>
</tr>
<tr>
<td><strong>Total Time</strong></td>
<td><strong>60 minutes</strong></td>
</tr>
</tbody>
</table>

Fluency Practice (12 minutes)

- Group Counting 3.OA.1 (4 minutes)
- Draw Rectangles 3.MD.5 (4 minutes)
- Draw Rectangular Arrays 3.MD.5 (4 minutes)

Group Counting (4 minutes)

Note: Group counting reviews interpreting multiplication as repeated addition.
Direct students to count forward and backward, occasionally changing the direction of the count.

- Sixes to 60
- Sevens to 70
- Eights to 80
- Nines to 90

Draw Rectangles (4 minutes)

Materials: (S) Grid paper

Note: This fluency reviews drawing a rectangle from a known area. Show student work that is correct, but looks different (e.g., a 6 × 2 unit rectangle juxtaposed with a 4 × 3 unit rectangle).

T: Draw a rectangle that has an area of 6 square units.
S: (Draw a 6 square unit rectangle.)

Continue with the following possible sequence: 10 square units, 12 square units, 16 square units, 24 square units, and 35 square units.
Draw Rectangular Arrays (4 minutes)

Materials: (S) Grid paper

Note: This fluency reviews finding area using side lengths.

T: Draw a $4 \times 2$ rectangular array using the squares on your grid paper.
T: How many square units are in your array?
S: 8 square units.

Continue with the following possible sequence: $6 \times 2$ units, $4 \times 3$ units, $6 \times 3$ units, $9 \times 2$ units, $6 \times 4$ units, and $3 \times 8$ units.

Application Problem (8 minutes)

Lori wants to replace the square tiles on her wall. The square tiles are sold in boxes of 8 square tiles. Lori buys 6 boxes of tiles. Does she have enough to replace all the tiles, including the tiles under the painting? Explain your answer.

Note: This problem reviews multi-step word problems in the context of using square tiles to measure area. It also reviews finding the array of an incomplete array from G3–M4–Lesson 6.

Concept Development (30 minutes)

Materials: (T) Meter stick, 12-inch ruler, pad of square sticky notes (S) 1 set per pair of 12 square-inch and 12 square-centimeter paper tiles from G3–M4–Lesson 2, personal white boards, rulers, area model template

Part 1: Explore the relationship between units and area.

T: One partner will use square inches, and the other will use square centimeters. Work together to decide on how to arrange your tiles to make the same shape rectangle. Then make that rectangle with your pieces.
S: (Decide on a rectangle and represent it using square inches and square centimeters.)
T: You and your partner each made the same shape rectangle. Is the area also the same?
S: Yes, because we both used the same number of pieces. → Yeah, but my pieces are smaller than yours. They’re square centimeters, and look, my shape takes up less space on the table. → The area of the shape with square inches is bigger because inches are bigger than centimeters.
T: Turn your personal board horizontal and write the area of your rectangle.
S: (Write either 12 sq in or 12 sq cm.)
T: (Draw 1 square meter on the board.) This is 1 square meter. Suppose you used 12 square-meter tiles to make your rectangle instead. Would this rectangle have a larger area or a smaller area than your original rectangle?
S: It would be much larger!
T: (Draw 1 square foot on the board.) How would your rectangle compare if you made it from 12 square feet?
S: It would be bigger than 12 square inches or centimeters, but smaller than 12 square meters.
T: (Hold up a pad of square sticky notes.) How about if you had used 12 sticky notes?
S: Still bigger than 12 square inches or centimeters, but smaller than 12 square feet or meters.
T: Why is it important to label the unit when you’re talking about area?
S: Because how much area there is changes if the unit is small or big. → If you don’t know the unit, you don’t really know what the area means. → It’s just like with length. Twelve of a shorter unit is shorter than 12 of a longer unit.

MP.6

Part 2: Relate area to multiplication to draw rectangular arrays.

S: (Possible list: 1 × 18, 18 × 1, 2 × 9, 9 × 2, 3 × 6, 6 × 3.)
T: (Draw a 3 cm by 6 cm rectangular array. Use a ruler to measure the side lengths on your board. Draw hash marks for each centimeter and connect them to draw in all of the squares.)
S: (Draw, label, and skip-count tiles in array.)
T: (Draw 1 square in or 12 sq in.) After you’ve drawn your squares, check your work by skip-counting the rows to find the total number of tiles you drew.
S: (Draw, label, and skip-count tiles in array.)
T: Turn your board so that it’s vertical. Does the rectangle still have the same area?
S: Yes.
T: But the side lengths switched places! Tell your partner how you know the area is the same.
S: The side lengths didn’t change, they just moved. → It’s the commutative property. We learned before you can turn an array and it doesn’t change how much is in it; the rows just turn into columns and columns turn into rows.
Part 3: Interpret area models to find area.

T: The grid you drew inside of your 3 cm by 6 cm rectangle shows a picture of all the tiles that make up the area. Carefully erase the grid lines in your rectangle. (Pause.) The empty rectangle with labeled side lengths that’s left is called an area model. How can you find the total area just using the labeled side lengths?

S: I can multiply! \( \rightarrow \) I can multiply the side lengths, 3 cm and 6 cm, to get the area, 18 square cm.

T: (Project or draw the area model at right.) What is the total area of my pictured rectangle?

S: 18 square cm.

T: Tell your partner how you figured out the area.

S: It’s easy. One side length is 18 and the other is 1. \( 18 \times 1 = 18 \). The labels tell you the unit is centimeters, so the area is square centimeters.

T: (Pass out the area model template.) Slip the area model template into your board. Use your ruler to measure the side lengths of one of the squares on the grid. (Allow students time to measure.) What unit is this grid made up of?

S: Square inches!

T: The side lengths of this area model aren’t labeled. Let’s draw a grid inside it to help us find the side lengths. Earlier we drew a grid inside a rectangle by drawing hash marks and using our ruler to connect the hash marks. Do we need to draw hash marks on the area model to draw a grid inside it?

S: No, we can just use the grid lines. \( \rightarrow \) No, the lines on the grid can act as hash marks because the area model is lined up with the grid.

T: Use your ruler and the lines on the grid to draw squares inside the area model. (Allow students time to work.) What size are the units inside the area model?

S: Square inches. \( \rightarrow \) They’re square inches because we used the square-inch grid paper to help us draw the squares.

T: Find and label the side lengths, then write an equation to find the area.

S: \( 2 \times 4 = 8 \) or \( 4 \times 2 = 8 \).

T: What is the area?

S: 8 square inches!
Lesson 7
NYS COMMON CORE MATHEMATICS CURRICULUM

Problem Set (10 minutes)

Students should do their personal best to complete the Problem Set within the allotted 10 minutes. For some classes, it may be appropriate to modify the assignment by specifying which problems they work on first. Some problems do not specify a method for solving. Students solve these problems using the RDW approach used for Application Problems.

Student Debrief (10 minutes)

Lesson Objective: Interpret area models to form rectangular arrays.

The Student Debrief is intended to invite reflection and active processing of the total lesson experience.

Invite students to review their solutions for the Problem Set. They should check work by comparing answers with a partner before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed in the Debrief. Guide students in a conversation to debrief the Problem Set and process the lesson.

You may choose to use any combination of the questions below to lead the discussion.

- What was your strategy for finding the total number of squares in Problem 2(c)?
- Invite students who drew arrays that demonstrate commutativity for Problem 4(a) (possibly 4 \times 6 and 6 \times 4) to share their work. Guide students to articulate understanding that commutativity still applies in the context of area.
- For Problem 4(b), most students answered that Mrs. Barnes’ array probably had 24 squares. Is there another answer that makes sense? (For example, 12, 48, 72.)
- Compare the area model to the array. How are they the same and different? (Guide discussion to include the commutativity of both models.)
Exit Ticket (3 minutes)

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help you assess the students’ understanding of the concepts that were presented in the lesson today and plan more effectively for future lessons. You may read the questions aloud to the students.
1. Use a straight edge to draw a grid of equal size squares within the rectangle. Find and label the side lengths. Then multiply the side lengths to find the area.

A. Area: _____ × _____ = _____ square units

B. Area: _____ × _____ = _____ square units

C. Area: _____ × _____ = _____ square units

D. Area: _____ × _____ = _____ square units

E. Area: _____ × _____ = _____ square units

F. Area: _____ × _____ = _____ square units
2. The area of Benjamin’s bedroom floor is shown on the grid to the right. Each \( \square \) = 1 square foot. How many total square feet is Benjamin’s floor?
   a. Label the side lengths.
   b. Use a straight edge to draw a grid of equal size squares within the rectangle.
   c. Find the total number of squares.

3. Mrs. Young’s art class needs to create a mural that covers exactly 35 square feet. Mrs. Young marks the area for the mural as shown on the grid below. Each \( \square \) = 1 square foot. Did she mark the area correctly? Explain your answer.

4. Mrs. Barnes draws a rectangular array. Mila skip-counts by fours and Jorge skip-counts by sixes to find the total number of square units in the array. When they give their answers, Mrs. Barnes says that they are both right.
   a. Use pictures, numbers, and words to explain how Mila and Jorge can both be right.
   b. How many square units might Mrs. Barnes’ array have had?
Name ____________________________________________ Date ________________

1. Label the side lengths of Rectangle A on the grid below. Use a straight edge to draw a grid of equal size squares within Rectangle A. Find the total area of Rectangle A.

rectangle A

Area: _______ square units

2. Mark makes a rectangle with 36 square-centimeter tiles. Gia makes a rectangle with 36 square-inch tiles. Whose rectangle has a bigger area? Explain your answer.
Lesson 7 Homework

Name ________________________ Date ________________

1. Find the area of each rectangular array. Label the side lengths of the matching area model and write a multiplication equation for each area model.

<table>
<thead>
<tr>
<th>Rectangular Arrays</th>
<th>Area Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td><img src="image" alt="Diagram" /></td>
</tr>
<tr>
<td></td>
<td>_____ square units</td>
</tr>
<tr>
<td>b.</td>
<td><img src="image" alt="Diagram" /></td>
</tr>
<tr>
<td></td>
<td>_____ square units</td>
</tr>
<tr>
<td>c.</td>
<td><img src="image" alt="Diagram" /></td>
</tr>
<tr>
<td></td>
<td>_____ square units</td>
</tr>
<tr>
<td>d.</td>
<td><img src="image" alt="Diagram" /></td>
</tr>
<tr>
<td></td>
<td>_____ square units</td>
</tr>
</tbody>
</table>
3. Jillian arranges square pattern blocks into a 7 by 4 array. Draw Jillian’s array on the grid below. How many square units are in Jillian’s rectangular array?

a. 

b. Label the side lengths of Jillian’s array from Part (a) on the rectangle below. Then write a multiplication sentence to represent the area of the rectangle.

4. Fiona draws a 24 square-centimeter rectangle. Gregory draws a 24 square-inch rectangle. Whose rectangle is larger in area? How do you know?
Lesson 7:
Interpret area models to form rectangular arrays.

Date: 9/30/13
Lesson 8

Objective: Find the area of a rectangle through multiplication of the side lengths.

Suggested Lesson Structure

- Fluency Practice (11 minutes)
- Application Problem (5 minutes)
- Concept Development (34 minutes)
- Student Debrief (10 minutes)
- Total Time (60 minutes)

Fluency Practice (11 minutes)

- Multiply by 6 3.OA.7 (8 minutes)
- Group Counting 3.OA.1 (3 minutes)

Multiply by 6 (8 minutes)

Materials: (S) Multiply by 6 Pattern Sheet (6–10)

Note: This activity builds fluency with multiplication facts using units of 6. It works toward students knowing from memory all products of two one-digit numbers. See G3–M4–Lesson 2 for the directions for administration of a Multiply By pattern sheet.

T: (Write 7 × 6 = ____.) Let’s skip-count up by sixes. (Count with fingers to 7 as students count.)
S: 6, 12, 18, 24, 30, 36, 42.

T: Let’s see how we can skip-count down to find the answer, too. (Show 10 fingers.) Start at 60. (Count down with your fingers as students say numbers.)
S: 60, 54, 48, 42.

Continue with the following possible sequence: 9 × 6, 6 × 6, and 8 × 6.

T: (Distribute Multiply by 6 Pattern Sheet.) Let’s practice multiplying by 6. Be sure to work left to right across the page.
**Group Counting (3 minutes)**

Note: Group counting reviews interpreting multiplication as repeated addition.

Direct students to count forward and backward, occasionally changing the direction of the count.

- Fours to 40
- Sevens to 70
- Eights to 80
- Nines to 90

**Application Problem (5 minutes)**

Marnie and Connor both skip-count square units to find the area of the same rectangle. Marnie counts, “3, 6, 9, 12, 15, 18, 21.” Connor counts, “7, 14, 21.” Draw what the rectangle might look like, then label the side lengths and find the area.

![Rectangle Diagram](image)

The area is 21 square units.

Note: This problem reinforces G3–M4–Lesson 7 and sets the foundation for today’s Concept Development. Invite students to share their drawings and discuss how they are similar and how they are different.

**Concept Development (34 minutes)**

Materials: (S) Personal white board, inch ruler, grid template

**Part 1: Relate side lengths to area.**

T: (Project image shown to the right.) How many rows are in the incomplete array?

S: 4 rows.

T: How many square units are there in each row?

S: 7 square units.
Lesson 8: Find the area of a rectangle through multiplication of the side lengths.

Date: 9/30/13

NOTES ON MULTIPLE MEANS OF ENGAGEMENT:
You may choose to have students work through these examples independently or in pairs.

NOTES ON MULTIPLE MEANS OF ENGAGEMENT:
You may want to help English language learners relate the number of square units in each row to the word columns, and relate columns and rows to side lengths. To some students it may appear that these words are used interchangeably. Help clarify meaning.

T: Talk to your partner: Do we need to complete the array to find the area of the rectangle? Why or why not?
S: Yes, then we can skip-count each row to find the total. → No, we already know the side lengths!

T: How are the side lengths related to the area?
S: If you multiply the side lengths together, the product is the same as the area.

T: Talk to a partner: Can you multiply any two side lengths to find the area?
S: No, you have to multiply the side length that shows the number of rows times the side length that shows the number of squares in each row.

T: What multiplication equation can be used to find the area of this rectangle?
S: 4 × 7 = 28.

T: In order to check our answer, use your grid template to trace and shade in an area model that is 4 units high and 7 units wide. Label each side length.
S: (Draw and label.)
T: Was our answer correct?
S: Yes, I used the grid paper to count 28 squares inside. → I skip-counted 4 sevens to make 28.

Continue with the following possible sequence: 6 by 5, 8 by 7, and 9 by 6.

Part 2: Use side lengths to find area.

(Draw or project the rectangle shown at right.)

T: What do you notice about this rectangle?
S: We know the side lengths, but there is no grid inside. → It’s an area model.

T: Do we still have enough information to find the area of this rectangle, even without the grid lines inside?
S: Yes! We know both side lengths.

T: Write the multiplication equation to find the area of this rectangle.
S: 6 × 8 = 48.
Lesson 8: Find the area of a rectangle through multiplication of the side lengths.

Date: 9/30/13

Part 3: Use area and side length to find unknown side length.

(Draw or project the rectangle shown at right.)

T: What do you notice about this rectangle?
S: We know the area, but not both side lengths. One of the side lengths is unknown.
T: Write a multiplication equation on your board to show how to find the area of this rectangle. Use a question mark for the unknown side length.
S: (Write $3 \times ? = 27$.)
T: What is the value of the question mark?
S: 9!
T: How do you know?
S: I know that 3 times 9 equals 27!
T: So what is the unknown side length?
S: 9 centimeters!
T: Write the related division equation on your board.
S: (Write $27 \div 3 = 9$.)

Continue with the following suggested examples:

T: When you know the area and one side length of a rectangle, how can you find the other side length?
S: I can think of it as a multiplication equation with a missing factor. Or, I can divide the area by the known side length.
Problem Set (10 minutes)

Students should do their personal best to complete the Problem Set within the allotted 10 minutes. For some classes, it may be appropriate to modify the assignment by specifying which problems they work on first. Some problems do not specify a method for solving. Students solve these problems using the RDW approach used for Application Problems.

Student Debrief (10 minutes)

Lesson Objective: Find the area of a rectangle through multiplication of the side lengths.

The Student Debrief is intended to invite reflection and active processing of the total lesson experience.

Invite students to review their solutions for the Problem Set. They should check work by comparing answers with a partner before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed in the Debrief. Guide students in a conversation to debrief the Problem Set and process the lesson.

You may choose to use any combination of the questions below to lead the discussion.

- In what way is the area of Problem 1(b) related to the area of Problem 1(a)? (It is double.) How could you use the side lengths to help you figure out that 8 × 7 is double 4 × 7?
- Explain how you can tell a shape is a square just by looking at the side lengths (Problem 1(c)).
- How are the rectangles in Problem 1(a) and 2(c) similar? How are they different?
- Address the following possible misconception in Problem 4. Even though Eliza’s bedroom has 1 side length (6 feet) that is 1 more than her brother’s bedroom (5 feet), and 1 side length (7 feet) that is 1 less than her brother’s bedroom (8 feet), the floor areas are not equal.
- Why is there a connection between a rectangle’s side lengths and its area?
Exit Ticket (3 minutes)

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help you assess the students’ understanding of the concepts that were presented in the lesson today and plan more effectively for future lessons. You may read the questions aloud to the students.
Multiply.

<table>
<thead>
<tr>
<th>6 x 1</th>
<th>6 x 2</th>
<th>6 x 3</th>
<th>6 x 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>_____</td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
</tr>
<tr>
<td>6 x 5</td>
<td>6 x 6</td>
<td>6 x 7</td>
<td>6 x 8</td>
</tr>
<tr>
<td>_____</td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
</tr>
<tr>
<td>6 x 9</td>
<td>6 x 10</td>
<td>6 x 5</td>
<td>6 x 6</td>
</tr>
<tr>
<td>_____</td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
</tr>
<tr>
<td>6 x 5</td>
<td>6 x 7</td>
<td>6 x 5</td>
<td>6 x 8</td>
</tr>
<tr>
<td>_____</td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
</tr>
<tr>
<td>6 x 5</td>
<td>6 x 9</td>
<td>6 x 5</td>
<td>6 x 10</td>
</tr>
<tr>
<td>_____</td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
</tr>
<tr>
<td>6 x 6</td>
<td>6 x 5</td>
<td>6 x 6</td>
<td>6 x 7</td>
</tr>
<tr>
<td>_____</td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
</tr>
<tr>
<td>6 x 6</td>
<td>6 x 8</td>
<td>6 x 6</td>
<td>6 x 9</td>
</tr>
<tr>
<td>_____</td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
</tr>
<tr>
<td>6 x 6</td>
<td>6 x 7</td>
<td>6 x 6</td>
<td>6 x 7</td>
</tr>
<tr>
<td>_____</td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
</tr>
<tr>
<td>6 x 8</td>
<td>6 x 7</td>
<td>6 x 9</td>
<td>6 x 7</td>
</tr>
<tr>
<td>_____</td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
</tr>
<tr>
<td>6 x 8</td>
<td>6 x 6</td>
<td>6 x 8</td>
<td>6 x 7</td>
</tr>
<tr>
<td>_____</td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
</tr>
<tr>
<td>6 x 8</td>
<td>6 x 9</td>
<td>6 x 9</td>
<td>6 x 6</td>
</tr>
<tr>
<td>_____</td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
</tr>
<tr>
<td>6 x 9</td>
<td>6 x 7</td>
<td>6 x 9</td>
<td>6 x 8</td>
</tr>
<tr>
<td>_____</td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
</tr>
<tr>
<td>6 x 9</td>
<td>6 x 8</td>
<td>6 x 6</td>
<td>6 x 9</td>
</tr>
<tr>
<td>_____</td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
</tr>
<tr>
<td>6 x 7</td>
<td>6 x 9</td>
<td>6 x 6</td>
<td>6 x 8</td>
</tr>
<tr>
<td>_____</td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
</tr>
<tr>
<td>6 x 9</td>
<td>6 x 7</td>
<td>6 x 6</td>
<td>6 x 8</td>
</tr>
<tr>
<td>_____</td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
</tr>
</tbody>
</table>
Lesson 8 Problem Set

1. Write a multiplication sentence to find the area of each rectangle.

a. 4 ft 7 ft
   Area: ______ sq ft
   ______ × ______ = ______

b. 8 ft 7 ft
   Area: ______ sq ft
   ______ × ______ = ______

c. 6 ft 6 ft
   Area: ______ sq ft
   ______ × ______ = ______

2. Write a multiplication sentence and a division sentence to find the unknown side length for each rectangle.

a. 9 ft ______ ft
   Area = 72 sq ft
   ______ × ______ = ______
   ______ ÷ ______ = ______

b. 3 ft ______ ft
   Area = 15 sq ft
   ______ × ______ = ______
   ______ ÷ ______ = ______

c. 4 ft ______ ft
   Area = 28 sq ft
   ______ × ______ = ______
   ______ ÷ ______ = ______

3. On the grid below, draw a rectangle that has an area of 42 square inches. Label the side lengths.
4. Ursa draws a rectangle that has side lengths of 9 centimeters and 6 centimeters. What is the area of the rectangle? Explain how you found your answer.

5. Eliza’s bedroom measures 6 feet by 7 feet. Her brother’s bedroom measures 5 feet by 8 feet. Eliza says their rooms have the same exact floor area. Is she right? Why or why not?

6. Cliff draws a rectangle with a side length of 6 inches and an area of 24 square inches. What is the other side length? How do you know?
Lesson 8 Exit Ticket

1. Write a multiplication sentence to find the area of the rectangle below.

   \[
   \text{Area: } \_\_\_\_ \text{ sq in}
   \]

   \[
   \_\_\_\_ \times \_\_\_\_ = \_\_\_\_
   \]

2. Write a multiplication sentence and a division sentence to find the unknown side length for the rectangle below.

   \[
   \text{Area: } 54 \text{ sq in}
   \]

   \[
   \_\_\_\_ \times \_\_\_\_ = \_\_\_\_
   \]

   \[
   \_\_\_\_ \div \_\_\_\_ = \_\_\_\_\_
   \]
Name __________________________________________ Date ________________

1. Write a multiplication sentence to find the area of each rectangle.

   a. 
   
   
   b. 
   
   
   c. 
   
   
   d. 
   

2. Write a multiplication sentence and a division sentence to find the unknown side length for each rectangle.

   a. 
   
   
   b. 
   
   

Find the area of a rectangle through multiplication of the side lengths.

Lesson 8: Find the area of a rectangle through multiplication of the side lengths.

© 2013 Common Core, Inc. Some rights reserved. commoncore.org  
This work is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported License.
2. On the grid below draw a rectangle that has an area of 32 square centimeters. Label the side lengths.

![Grid with labeled sides](grid.png)

3. Patricia draws a rectangle that has side lengths of 4 centimeters and 9 centimeters. What is the area of the rectangle? Explain how you found your answer.

4. Charles draws a rectangle with a side length of 9 inches and an area of 27 square inches. What is the other side length? How do you know?
Lesson 8: Find the area of a rectangle through multiplication of the side lengths.

Date: 9/30/13