GRADE 3 • MODULE 4
Multiplication and Area

Module Overview ............................................................................................................................................... i
Topic A: Foundations for Understanding Area ......................................................................................... 4.A.1
Topic B: Concepts of Area Measurement ............................................................................................... 4.B.1
Topic C: Arithmetic Properties Using Area Models .............................................................................. 4.C.1
Topic D: Applications of Area Using Side Lengths of Figures ............................................................. 4.D.1
Module Assessments ............................................................................................................................... 4.S.1
Lesson 1 Problem Set

NYS COMMON CORE MATHEMATICS CURRICULUM

Name __________________________ Date _________________

1. Use green triangle pattern blocks to cover each shape below. Draw lines to show where the triangles meet. Then write how many triangle pattern blocks it takes to cover each shape.

   Shape A: _______ triangles

   Shape B: _______ triangles

2. Use blue rhombus pattern blocks to cover each shape below. Draw lines to show where the rhombuses meet. Then write how many rhombus pattern blocks it takes to cover each shape.

   Shape A: _______ rhombuses

   Shape B: _______ rhombuses

3. Use red trapezoid pattern blocks to cover each shape below. Draw lines to show where the trapezoids meet. Then write how many trapezoid pattern blocks it takes to cover each shape.

   Shape A: _______ trapezoids

   Shape B: _______ trapezoids
4. How is the number of pattern blocks needed to cover the same shape related to the size of the pattern blocks?

5. Use orange square pattern blocks to cover the rectangle below. Draw lines to show where the squares meet. Then write how many square pattern blocks it takes to cover the rectangle.

6. Use red trapezoid pattern blocks to cover the rectangle in Problem 5. Can you use red trapezoid pattern blocks to measure the area of this rectangle? Explain your answer.
Lesson 1 Exit Ticket

Name ____________________________ Date ______________

1. Each ________ is 1 square unit. Do both rectangles have the same area? Explain how you know.

   a. 
   
   b. 

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

This work is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported License.
1. Magnus covers the same shape with triangles, rhombuses, and trapezoids
   
   a. How many triangles will it take to cover the shape?
      
      _______ triangles
      
   b. How many rhombuses will it take to cover the shape?
      
      _______ rhombuses
      
   c. Magnus notices that 3 triangles from Part (a) cover 1 trapezoid. How many trapezoids will it take to cover the shape below? Explain your answer.
      
      _______ trapezoids
2. Angela uses squares to find the area of a rectangle. Her work is shown below.
   a. How many squares did she use to cover the rectangle?

   _______ squares

   b. What is the area of the rectangle in square units? Explain how you found your answer.

3. Each ______ is 1 square unit. Which rectangle has the biggest area? How do you know?

   Rectangle A

   Rectangle B

   Rectangle C
Lesson 2 Problem Set

Name ___________________________________________ Date ____________________

1. Use all of Paper Strip 1, which you cut into 12 square inches, to complete the chart below.

<table>
<thead>
<tr>
<th>Drawing</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rectangle A</td>
<td></td>
</tr>
<tr>
<td>Rectangle B</td>
<td></td>
</tr>
<tr>
<td>Rectangle C</td>
<td></td>
</tr>
</tbody>
</table>

2. Use all of Paper Strip 2, which you cut into 12 square centimeters, to complete the chart below.

<table>
<thead>
<tr>
<th>Drawing</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rectangle A</td>
<td></td>
</tr>
<tr>
<td>Rectangle B</td>
<td></td>
</tr>
<tr>
<td>Rectangle C</td>
<td></td>
</tr>
</tbody>
</table>
3. Compare the areas of the rectangles you made with Paper Strip 1 and Paper Strip 2. What changed? Why did it change?

4. Maggie uses her square inch pieces to create these two rectangles. Do the two rectangles have the same area? How do you know?

5. Count to find the area of the rectangle below. Then draw a different rectangle that has the same area.
Lesson 2 Exit Ticket

1. Each □ is a square unit. Find the area of the rectangle below. Then draw a different rectangle with the same number of square units.

2. Zach creates a rectangle with an area of 6 square inches. Luke makes a rectangle with an area of 6 square centimeters. Do the two rectangles have the same area? Why or why not?
Lesson 2: Decompose and recompose shapes to compare areas.

Date: 9/30/13

Name ___________________________  Date __________________

1. Each □ is a square unit. Count to find the area of each rectangle. Then circle all the rectangles with an area of 12 square units.

   a.  
   
   b.  
   
   c.  

   Area = _______ square units

   Area = _______ square units

   Area = _______ square units

   Area = _______ square units

   d.  
   
   e.  

   Area = _______ square units

   Area = _______ square units

   Area = _______ square units

   f.  

   Area = _______ square units
2. Colin uses square inch pieces to create these rectangles. Do they have the same area? Explain.

![Rectangles](image)

3. Each is a square unit. Count to find the area of the rectangle below. Then draw a different rectangle that has the same area.

![Rectangle](image)
Lesson 3 Problem Set

Name ________________________________ Date ____________________

1. Each □ is 1 square unit. What is the area of each of the following rectangles?

```

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>B</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

A: __________________________ square units

B: __________________________

C: __________________________

D: __________________________

2. Each □ is 1 square unit. What is the area of each of the following rectangles?

```

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

a. __________________________

b. __________________________

c. __________________________

d. __________________________

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

This work is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported License.
3. How would the rectangles in Problem 1 be different if they were composed of square inches?

b. Select one rectangle from Problem 1 and recreate it on square-inch and square-centimeter grid paper.

4. Use a separate piece of square-centimeter grid paper. Draw four different rectangles that each has an area of 8 square centimeters.
Name _________________________________ Date ____________________

1. Each ◯ is 1 square unit. Write the area of Rectangle A. Then draw another rectangle with the same area in the space provided.

   ![Rectangle A]

   Area = ________________________________

2. Each ◯ is 1 square unit. Does this rectangle have the same area as Rectangle A? Explain.

   ![Rectangle B]
Lesson 3: Model tiling with centimeter and inch unit squares as a strategy to measure area

Name ___________________________ Date _________________

1. Each □ is 1 square unit. What is the area of each of the following rectangles?

   A: ______ square units
   B: ______ square units
   C: ______ square units
   D: ______ square units

2. Each □ is 1 square unit. What is the area of each of the following rectangles?

   a. ___________________________
   b. ___________________________
   c. ___________________________
   d. ___________________________
3. Each is 1 square unit. Write the area of each rectangle. Then draw another rectangle with the same area in the space provided.

Area = ______________ square units

Area = ______________________

Area = ______________________
Lesson 3:

Model tiling with centimeter and inch unit squares as a strategy to measure area.

Date: 9/30/13
Lesson 3: Model tiling with centimeter and inch unit squares as a strategy to measure area.

Date: 9/30/13

This work is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported License.
1. Use a ruler to measure the side lengths of the rectangle in centimeters. Mark each centimeter with a point and connect the points to show the square units. Then count the squares you drew to find the total area.

Total area: ________________________________

2. Use a ruler to measure the side lengths of the rectangle in inches. Mark each inch with a point and connect the points to show the square units. Then count the squares you drew to find the total area.

Total area: ________________________________

3. Mariana uses square-centimeter tiles to find the side lengths of the rectangle below. Label each side length. Then count the tiles to find the total area.

Total area: ________________________________
4. Each square is 1 square centimeter. Saffron says that the side length of the rectangle below is 4 centimeters. Kevin says the side length is 5 centimeters. Who is correct? Explain how you know.

![Rectangle](image)

5. Use both square-centimeter and square-inch tiles to find the area of the rectangle below. Which works best? Explain why.

![Rectangle](image)

6. How does knowing side lengths A and B help you find side lengths C and D on the rectangle below?

![Rectangle](image)
Label the side lengths of each rectangle. Then match the rectangle to its total area.

12 sq cm

5 sq in

6 sq cm
1. Ella placed square-centimeter tiles on the rectangle below, and then labeled the side lengths. What is the area of her rectangle?

```
2 cm
```

```
4 cm
```

Total area: ________________________

2. Kyle uses square-centimeter tiles to find the side lengths of the rectangle below. Label each side length. Then count the tiles to find the total area.

```
```

Total area: ________________________

3. Maura uses square-inch tiles to find the side lengths of the rectangle below. Label each side length. Then find the total area.

```
```

Total area: ________________________
4. Each square unit below is 1 square inch. Claire says that the side length of the rectangle below is 3 inches. Tyler says the side length is 5 inches. Who is correct? Explain how you know.

5. Label the unknown side lengths for the rectangle below, then find the area. Explain how you used the lengths provided to find the unknown lengths and area.
Lesson 5 Problem Set

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: 18 square centimeters.

   
   
   
   3 cm
   
   3 6 9 12 15 18
   
   ____ × ____ = ____

   b. Area: ____ square centimeters.

   4 cm
   
   ____ × ____ = ____

   c. Area: 18 square centimeters.

   6 cm
   
   ____ × ____ = ____

   d. Area: 24 square centimeters.

   
   
   
   3 cm
   
   ____ × ____ = ____

   e. Area: 20 square centimeters.

   
   
   
   5 cm
   
   ____ × ____ = ____

   f. Area: ____ square centimeters.

   
   
   
   3 cm
   
   ____ × ____ = ____
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.
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.
      
      \[ \begin{array}{c}
      4 \times \underline{\phantom{1}} = 24 \\
      \end{array} \]

   b. Area: 24 square centimeters.
      
      \[ \begin{array}{c}
      \underline{\phantom{1}} \times 6 = \underline{24} \\
      \end{array} \]

   c. Area: 15 square centimeters.
      
      \[ \begin{array}{c}
      \underline{\phantom{1}} \times \underline{\phantom{1}} = \underline{15} \\
      \end{array} \]

   d. Area: 15 square centimeters.
      
      \[ \begin{array}{c}
      \underline{\phantom{1}} \times \underline{\phantom{1}} = \underline{15} \\
      \end{array} \]
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 Problem Set

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

__ × ____ = ____ 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.

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?

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.
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.

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. 
   
   
   ____ × ____ = _____ sq cm

   b. 
   
   
   ____ × ____ = _____ sq cm

   c. 
   
   
   ____ × ____ = _____ sq cm

   d. 
   
   
   ____ × ____ = _____ sq cm

   e. 
   
   
   ____ × ____ = _____ sq cm

   f. 
   
   
   ____ × ____ = _____ 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?

Lesson 6: 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
Lesson 7 Problem Set

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 \( \text{square foot} \) = 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 \( \text{square foot} \) = 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](image)

   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.
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></td>
</tr>
<tr>
<td><img src="image1.png" alt="Rectangular Array" /></td>
<td><img src="image2.png" alt="Area Model" /></td>
</tr>
<tr>
<td></td>
<td>3 x _______ = _______</td>
</tr>
<tr>
<td>b.</td>
<td></td>
</tr>
<tr>
<td><img src="image3.png" alt="Rectangular Array" /></td>
<td><img src="image4.png" alt="Area Model" /></td>
</tr>
<tr>
<td></td>
<td>______ x _______ = _______</td>
</tr>
<tr>
<td>c.</td>
<td></td>
</tr>
<tr>
<td><img src="image5.png" alt="Rectangular Array" /></td>
<td><img src="image6.png" alt="Area Model" /></td>
</tr>
<tr>
<td></td>
<td>______ x _______ = _______</td>
</tr>
<tr>
<td></td>
<td>______ square units</td>
</tr>
<tr>
<td>d.</td>
<td></td>
</tr>
<tr>
<td><img src="image7.png" alt="Rectangular Array" /></td>
<td><img src="image8.png" alt="Area Model" /></td>
</tr>
<tr>
<td></td>
<td>______ x _______ = _______</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?
Interpret area models to form rectangular arrays.
Lesson 8 Problem Set

Name ____________________________ Date ____________________

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
      Area = 72 sq ft
      _____ × _____ = _____
      _____ ÷ _____ = _____
      _____ × _____ = _____
      _____ ÷ _____ = _____

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

   c. 4 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.

   [Grid Image]
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

Name ________________________________ Date ________________

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

   3 inches
   9 inches

   Area: _____ sq in

   _____ × _____ = ______

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

   6 inches
   _____ inches

   Area: 54 sq in

   _____ × _____ = ______
   ______ ÷ ______ = ______
Name _______________________________ Date __________________

1. Write a multiplication sentence to find the area of each rectangle.
   a. 
   
   Area: _____ sq cm

   _____ × _____ = _____

   b. 
   
   Area: _____ sq cm

   _____ × _____ = _____

   c. 
   
   Area: _____ sq ft

   _____ × _____ = _____

   d. 
   
   Area: _____ sq ft

   _____ × _____ = _____

2. Write a multiplication sentence and a division sentence to find the unknown side length for each rectangle.
   a. 
   
   Area: 24 sq ft

   _____ × _____ = _____
   _____ ÷ _____ = _____

   b. 
   
   Area: 36 sq ft

   _____ × _____ = _____
   _____ ÷ _____ = _____
2. On the grid below draw a rectangle that has an area of 32 square centimeters. Label the side lengths.

![Grid with 4x8 pattern](image)

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
Lesson 9 Problem Set

1. Cut the grid into 2 equal rectangles.
   a. Draw and label the side lengths of the 2 rectangles.
   b. Write an equation to find the area of 1 of the rectangles.
   c. Write an equation to show the total area of the 2 rectangles.

2. Place your 2 equal rectangles side by side to create a new, longer rectangle.
   a. Draw an area model to show the new rectangle. Label the side lengths.
   b. Find the total area of the longer rectangle.
3. Furaha and Rahema use square tiles to make the rectangles shown below.

![Furaha's Rectangle](image1)

![Rahema's Rectangle](image2)

a. Label the side lengths on the rectangles above and find the area of each rectangle.

b. Furaha pushes his rectangle next to Rahema’s rectangle to form a new, longer rectangle. Draw an area model to show the new rectangle. Label the side lengths.

c. Rahema says the area of the new, longer rectangle is 52 square units. Is she right? Explain your answer.

4. Kiera says she can find the area of the long rectangle below by adding the areas of Rectangles A and B. Is she right? Why or why not?
Lamar uses square tiles to make the 2 rectangles shown below.

![Rectangle A and Rectangle B](image)

a. Label the side lengths of the 2 rectangles.

b. Write equations to find the areas of the rectangles.

   Area of Rectangle A: _______________   Area of Rectangle B: _______________

c. Lamar pushes Rectangle A next to Rectangle B to make a bigger rectangle. What is the area of the bigger rectangle? How do you know?
Lesson 9 Homework

1. Use the grid to answer the questions below.

   a. Draw a line to show how to divide the grid into 2 equal rectangles. Shade in 1 of the rectangles.

   b. Label the side lengths of each rectangle.

   c. Write an equation to show the total area of the 2 rectangles.
2. Alexa cuts out the 2 equal rectangles from Problem 1(a) and puts the two shorter sides together.
   a. Draw Alexa’s new rectangle and label the side lengths below.

   b. Find the total area of the new, longer rectangle.

   c. Is the area of the new, longer rectangle equal to the total area in Problem 1(c)? Explain why or why not.
Lesson 9: Analyze different rectangles and reason about their area.

Date: 9/30/13
Lesson 10: Apply the distributive property as a strategy to find the total area of a large rectangle by adding two products.

Date: 9/30/13

1. Label the side lengths of the shaded and unshaded rectangles. Then find the total area of the large rectangle by adding the areas of the two smaller rectangles.

a. 

\[
8 \times 7 = (5 + 3) \times 7
\]

\[
= (5 \times 7) + (3 \times 7)
\]

\[
= \underline{35} + \underline{21}
\]

\[
= \underline{56} \text{ square units}
\]

b. 

\[
12 \times 4 = (\underline{10} + 2) \times 4
\]

\[
= (\underline{10} \times 4) + (2 \times 4)
\]

\[
= \underline{40} + \underline{8}
\]

\[
= \underline{48} \text{ square units}
\]

c. 

\[
6 \times 13 = 6 \times (\underline{10} + 3)
\]

\[
= (6 \times \underline{10}) + (6 \times 3)
\]

\[
= \underline{60} + \underline{18}
\]

\[
= \underline{78} \text{ square units}
\]

d. 

\[
8 \times 12 = 8 \times (\underline{8} + \underline{4})
\]

\[
= (8 \times \underline{8}) + (8 \times \underline{4})
\]

\[
= \underline{64} + \underline{32}
\]

\[
= \underline{96} \text{ square units}
\]
2. Vince imagines 1 more row of eight to find the total area of a $9 \times 8$ rectangle. Explain how this could help him solve $9 \times 8$.

3. Shade to break the $15 \times 5$ rectangle into 2 smaller rectangles. Then find the sum of the areas of the 2 smaller rectangles to find the total area. Explain your thinking.
Lesson 10 Exit Ticket

Label the side lengths of the shaded and unshaded rectangles. Then find the total area of the large rectangle by adding the areas of the 2 smaller rectangles.

a. 
\[ 8 \times 7 = 8 \times (\_\_\_\_ + \_\_\_\_ ) \]

\[ = (8 \times \_\_\_\_ ) + (8 \times \_\_\_\_ ) \]

\[ = \_\_\_\_\_\_\_ + \_\_\_\_\_\_\_ \]

\[ = \_\_\_\_\_\_\_\_\_\_\_\_ square units \]

b. 
\[ 9 \times 13 = 9 \times (\_\_\_\_ + \_\_\_\_ ) \]

\[ = (\_\_\_\_\_\_ \times \_\_\_\_\_\_ ) + (\_\_\_\_\_\_ \times \_\_\_\_\_\_ ) \]

\[ = \_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_ \]

\[ = \_\_\_\_\_\_\_\_\_\_\_\_ square units \]
1. Label the side lengths of the shaded and unshaded rectangles. Then find the total area of the large rectangle by adding the areas of the 2 smaller rectangles.

a. 

\[ 9 \times 8 = (5 + 4) \times 8 \]

\[ = (5 \times 8) + (4 \times 8) \]

\[ = _____ + _____ \]

\[ = _____ \text{ square units} \]

b. 

\[ 12 \times 5 = (_____ + 2) \times 5 \]

\[ = (_____ \times 5) + (2 \times 5) \]

\[ = _____ + 10 \]

\[ = _____ \text{ square units} \]

c. 

\[ 7 \times 13 = 7 \times (_______ + 3) \]

\[ = (7 \times ______) + (7 \times 3) \]

\[ = _____ + _____ \]

\[ = _____ \text{ square units} \]

d. 

\[ 9 \times 12 = 9 \times (_______ + _____ ) \]

\[ = (9 \times ______) + (9 \times _____) \]

\[ = _____ + _____ \]

\[ = _____ \text{ square units} \]
2. Finn imagines 1 more row of nine to find the total area of $9 \times 9$ rectangle. Explain how this could help him solve $9 \times 9$.

3. Shade to break the $16 \times 4$ rectangle into 2 smaller rectangles. Then find the sum of the areas of the 2 smaller rectangles to find the total area. Explain your thinking.
Lesson 10: Apply the distributive property as a strategy to find the total area of a large rectangle by adding two products.

Date: 9/30/13
1. The rectangles below have the same area. Move the ( ) to find the missing side lengths. Then solve.

   a. Area: \( 8 \times _____ = _____ \text{sq cm} \)

   b. Area: \( 1 \times 48 = _____ \text{sq cm} \)

   c. Area: \( 8 \times 6 = (2 \times 4) \times 6 \)

      \[ = 2 \times 4 \times 6 \]

      \[ = _____ \times _____ \]

      \[ = _____ \text{sq cm} \]

   d. Area: \( 8 \times 6 = (4 \times 2) \times 6 \)

      \[ = 4 \times 2 \times 6 \]

      \[ = _____ \times _____ \]

      \[ = _____ \text{sq cm} \]

   e. Area: \( 8 \times 6 = 8 \times (2 \times 3) \)

      \[ = 8 \times 2 \times 3 \]

      \[ = _____ \times _____ \]

      \[ = _____ \text{sq cm} \]

2. Does Problem 1 show all the possible whole number side lengths for a rectangle with an area of 48 square centimeters? How do you know?
3. In Problem 1, what happens to the shape of the rectangle as the difference between the side lengths gets smaller?

4. 
   a. Find the area of the rectangle below.

   
   
   
   
   
   
   8 cm
   
   
   9 cm

   b. Julius says a 4 cm by 18 cm rectangle has the same area as the rectangle in Part (a). Place ( ) in the equation to find the related fact and solve. Is Julius correct? Why or why not?

   
   \[ 4 \times 18 = 4 \times 2 \times 9 \]
   
   \[ = 4 \times 2 \times 9 \]
   
   \[ = \underline{\quad \times \quad} \]
   
   \[ = \underline{\quad} \text{ sq cm} \]

   c. Use the expression 8 \times 9 to find different side lengths for a rectangle that has the same area as the rectangle in Part (a). Show your equations using ( ). Then estimate to draw the rectangle and label the side lengths.
Lesson 11 Exit Ticket

NYS COMMON CORE MATHEMATICS CURRICULUM

Name ____________________________ Date _________________

1. Find the area of the rectangle.

   \[
   \text{Area: } 8 \times 8 = (4 \times 2) \times 8 \\
   = 4 \times 2 \times 8 \\
   = ____ \times ____ \\
   = _____ \text{ sq cm}
   \]

2. The rectangle below has the same area as the rectangle in Problem 1. Move the ( ) to find the missing side lengths. Then solve.

   \[
   \text{Area: } 8 \times 8 = (4 \times 2) \times 8 \\
   = 4 \times 2 \times 8 \\
   = ____ \times ____ \\
   = _____ \text{ sq cm}
   \]
1. The rectangles below have the same area. Move the ( ) to find the missing side lengths. Then solve.

   - a. Area: \(4 \times \_\_\_ = \_\_\_\_\_\_\_sq \text{ cm}\)
   - b. Area: \(1 \times 36 = \_\_\_\_\_sq \text{ cm}\)
   - c. Area: \(4 \times 9 = 4 \times (3 \times 3)\)
     \[= 4 \times 3 \times 3\]
     \[= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_sq \text{ cm}\]
   - d. Area: \(12 \times 3 = (6 \times 2) \times 3\)
     \[= 6 \times 2 \times 3\]
     \[= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_sq \text{ cm}\)

2. Does Problem 1 show all the possible whole number side lengths for a rectangle with an area of 36 square centimeters? How do you know?
3.
   a. Find the area of the rectangle below.

   [Diagram of a rectangle with dimensions 6 cm by 8 cm]

   b. Hilda says a 4 cm by 12 cm rectangle has the same area as the rectangle in Part (a). Place ( ) in the equation to find the related fact and solve. Is Hilda correct? Why or why not?

   \[4 \times 12 = 4 \times 2 \times 6\]
   \[= 4 \times 2 \times 6\]
   \[= \underline{\ } \times \underline{\ }\]
   \[= \underline{\ } \text{ sq cm}\]

   c. Use the expression 8 × 6 to find different side lengths for a rectangle that has the same area as the rectangle in Part (a). Show your equations using ( ). Then estimate to draw the rectangle and label the side lengths.
Name ___________________________________________  Date _____________________

1. Each side on a sticky note measures 9 centimeters. What is the area of the sticky note?

2. Stacy tiles the rectangle below using her square pattern blocks. Find the area of Stacy’s rectangle in square units. Then draw and label a different rectangle with whole number side lengths and having the same area.

b. Can you draw another rectangle with different whole number side lengths and having the same area? Explain how you know.
3. An artist paints a 4 × 16 foot mural on a wall. What is the total area of the mural? Use the break apart and distribute strategy.

4. Alana tiles the 3 figures below. She says, “I’m making a pattern!”

   a. Find the area of the Alana’s 3 figures and explain her pattern.

   b. Draw the next 2 figures in Alana’s pattern and find their areas.

5. Jermaine glues 3 identical pieces of paper as shown below and makes a square. Find the missing side length of 1 piece of paper. Then find the total area of 2 pieces of paper.
Name ___________________________ Date __________________

1. A painting has an area of 63 square inches. One side length is 9 inches. What is the other side length?

   ![Diagram of a rectangle with one side length of 9 inches and area 63 square inches.]

\[ \text{Area} = 63 \text{ square inches} \]

2. Judy’s mini dollhouse measures 4 inches by 16 inches. What is the total area of the dollhouse?
Lesson 12 Homework

Name ___________________________________________ Date __________________

1. A square calendar has sides that are 9 inches long. What is the calendar’s area?

2. Each __________ is 1 square unit. Sienna uses the same square units to draw a 6 × 2 rectangle and says that it has the same area as the rectangle below. Is she correct? Explain why or why not.

![Rectangle Diagram]

3. The surface of an office desk has an area of 15 square feet. Its length is 5 feet. How wide is the office desk?
4. A rectangular garden has a total area of 48 square yards. Draw and label two possible rectangular gardens with different side lengths having the same area.

5. Lila makes the pattern below. Find and explain her pattern. Then draw the fifth figure in her pattern.
1. Each of the following figures is made up of 2 rectangles. Find the total area of each figure.

**Figure 1**: Area of A + Area of B: _______ + _______ = _______ sq units

**Figure 2**: Area of C + Area of D: _______ + _______ = _______ sq units

**Figure 3**: Area of E + Area of F: _______ + _______ = _______ sq units

**Figure 4**: Area of G + Area of H: _______ + _______ = _______ sq units
2. The figure shows a small rectangle cut out of a big rectangle. Find the area of the shaded region.

\[ \text{Area of the shaded region: } \text{big rectangle area} - \text{small rectangle area} = \text{shaded area} \text{ sq cm} \]

3. The figure shows a small rectangle cut out of a big rectangle.

a. Label the missing measurements.

b. Area of the big rectangle: \[ \text{length} \times \text{width} = \text{area} \text{ sq cm} \]

c. Area of the small rectangle: \[ \text{length} \times \text{width} = \text{area} \text{ sq cm} \]

d. Find the area of the shaded region.
The following figure is made up of 2 rectangles. Find the total area of the figure.

Area of A + Area of B: _______ + _______ = _______ sq units
1. Each of the following figures is made up of 2 rectangles. Find the total area of each figure.

**Figure 1**: Area of A + Area of B: ________ + _________ = _________ sq units

**Figure 2**: Area of C + Area of D: ________ + _________ = __________ sq units

**Figure 3**: Area of E + Area of F: ________ + _________ = __________ sq units

**Figure 4**: Area of G + Area of H: ________ + _________ = __________ sq units
2. The figure shows a small rectangle cut out of a big rectangle. Find the area of the shaded region.

![Diagram of a big rectangle with a small rectangle cut out of it, labeled with dimensions: 8 cm by 7 cm, and the small rectangle is 3 cm by 3 cm.]

Area of the shaded region: ______ - ______ = ______ sq cm

3. The figure shows a small rectangle cut out of a big rectangle.

a. Label the missing measurements.

b. Area of the big rectangle: ______ × ______ = ______ sq cm

c. Area of the small rectangle: ______ × ______ = ______ sq cm

d. Find the area of the shaded region.
Lesson 13: Find areas by decomposing into rectangles or completing composite figures to form rectangles.

Date: 9/30/13
Lesson 14 Problem Set

Name ___________________________ Date ______________________

1. Find the area of each of the following figures. All figures are made up of rectangles.

a. 

![Diagram of a T-shaped figure with dimensions 2 cm x 3 cm and 2 cm x 3 cm]

b. 

![Diagram of a rectangle with dimensions 4 m x 1 m and 2 m x 1 m]

2. The figure below shows a small rectangle in a big rectangle. Find the area of the shaded part of the figure.

![Diagram of a rectangle with dimensions 5 m x 6 m and a smaller rectangle with dimensions 2 m x 2 m]

Lesson 14: Find areas by decomposing into rectangles or completing composite figures to form rectangles.

Date: 10/1/13

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

This work is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported License.
3. A paper rectangle has a length of 6 inches and a width of 8 inches. A square with a side length of 3 inches was cut out of it. What is the area of the remaining paper?

4. Tila and Evan both have paper rectangles measuring 6 cm by 9 cm. Tila cuts a 3 cm by 4 cm rectangle out of hers and Evan cuts a 2 cm by 6 cm rectangle out of his. Tila says she has more paper left over. Evan says they have the same amount. Who is correct? Show your work below.
Name ____________________________ Date ______________

Mary draws an 8 cm by 6 cm rectangle on her grid paper. She shades a square with a side length of 4 cm inside her rectangle. What area of the rectangle is left unshaded?
Lesson 14 Homework

Name ___________________________ Date ______________

1. Find the area of each of the following figures. All figures are made up of rectangles.

a. 

![Diagram of a figure composed of rectangles with dimensions 6 feet, 3 feet, and 8 feet]

b. 

![Diagram of a figure composed of rectangles with dimensions 8 inches, 5 inches, 3 inches, 2 inches, and 4 inches]
2. The figure below shows a small rectangle cut out of a big rectangle.

![Diagram of a rectangle with a smaller rectangle cut out of it.]

a. Label the side lengths of the unshaded region.

b. Find the area of the shaded region.
Name ___________________________ Date ________________

1. Make a prediction: Which room looks like it has the biggest area?

2. Record the areas and show the strategy you used to find each area.

<table>
<thead>
<tr>
<th>Room</th>
<th>Area</th>
<th>Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedroom 1</td>
<td>______ sq cm</td>
<td></td>
</tr>
<tr>
<td>Bedroom 2</td>
<td>______ sq cm</td>
<td></td>
</tr>
<tr>
<td>Kitchen</td>
<td>______ sq cm</td>
<td></td>
</tr>
<tr>
<td>Hallway</td>
<td>______ sq cm</td>
<td></td>
</tr>
<tr>
<td>Bathroom</td>
<td>______ sq cm</td>
<td></td>
</tr>
<tr>
<td>Dining Room</td>
<td>______ sq cm</td>
<td></td>
</tr>
<tr>
<td>Living Room</td>
<td>______ sq cm</td>
<td></td>
</tr>
</tbody>
</table>
3. Which room has the biggest area? Was your prediction right? Why or why not?

4. Your clients buy 3 boxes of square centimeter tiles. Each box has 8 tiles. Are there enough tiles to cover the entire bathroom floor? Explain your answer.

5. Find the side lengths of the house without using your ruler to measure them and explain the process you used.

   Side lengths: __________ centimeters and __________ centimeters

6. What is the area of the whole floor plan? How do you know?

   Area = __________ square centimeters
The rooms in the floor plan below are rectangles or made up of rectangles.

Bedroom 1

Bathroom

Kitchen

Hallway

Bedroom 2

Dining Room

Living Room
Name _____________________________  Date ___________________

Jack uses grid paper to create a floor plan of his room. Label the missing measurements and find the area of the items listed below.

<table>
<thead>
<tr>
<th>Name</th>
<th>Equations</th>
<th>Total Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Jack’s Room</td>
<td></td>
<td>______ square units</td>
</tr>
<tr>
<td>b. Bed</td>
<td></td>
<td>______ square units</td>
</tr>
<tr>
<td>c. Table</td>
<td></td>
<td>______ square units</td>
</tr>
<tr>
<td>d. Dresser</td>
<td></td>
<td>______ square units</td>
</tr>
<tr>
<td>e. Desk</td>
<td></td>
<td>______ square units</td>
</tr>
</tbody>
</table>
Use a ruler to measure the side lengths of each lettered room in centimeters. Then find the area. Use the measurements below to match and label the rooms with the correct areas.

- Kitchen - 28 square centimeters
- Garage - 72 square centimeters
- Porch - 32 square centimeters
- Bedroom - 56 square centimeters
- Bathroom - 24 square centimeters
- Hallway - 12 square centimeters
**Optional:** Record the new side lengths you have chosen for each of the rooms and show that these side lengths equal the required area. For non-rectangular rooms, record the side lengths and areas of the small rectangles. Then show how the areas of the small rectangles equal the required area.

<table>
<thead>
<tr>
<th>Room</th>
<th>New Side Lengths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedroom 1:</td>
<td></td>
</tr>
<tr>
<td>60 sq cm</td>
<td></td>
</tr>
<tr>
<td>Bedroom 2:</td>
<td></td>
</tr>
<tr>
<td>56 sq cm</td>
<td></td>
</tr>
<tr>
<td>Kitchen:</td>
<td></td>
</tr>
<tr>
<td>42 sq cm</td>
<td></td>
</tr>
<tr>
<td>Room</td>
<td>New Side Lengths</td>
</tr>
<tr>
<td>---------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Hallway:</td>
<td></td>
</tr>
<tr>
<td>24 sq cm</td>
<td></td>
</tr>
<tr>
<td>Bathroom:</td>
<td></td>
</tr>
<tr>
<td>25 sq cm</td>
<td></td>
</tr>
<tr>
<td>Dining Room:</td>
<td></td>
</tr>
<tr>
<td>28 sq cm</td>
<td></td>
</tr>
<tr>
<td>Living Room:</td>
<td></td>
</tr>
<tr>
<td>88 sq cm</td>
<td></td>
</tr>
</tbody>
</table>
Lesson 16 Exit Ticket

Find the area of the shaded region. Then draw and label a rectangle with the same area.

4 cm
7 cm
4 cm

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

This work is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported License.
Jeremy plans and designs his own dream playground on grid paper. His new playground will cover a total area of 72 square units. The chart shows how much space he gives for each piece of equipment, or area. Use the information in the chart to draw and label a possible way Jeremy can plan his playground.

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basketball Court</td>
<td>10 square units</td>
</tr>
<tr>
<td>Jungle Gym</td>
<td>9 square units</td>
</tr>
<tr>
<td>Slide</td>
<td>6 square units</td>
</tr>
<tr>
<td>Soccer Area</td>
<td>24 square units</td>
</tr>
</tbody>
</table>
1. Jasmine and Roland each use unit squares to tile a piece of paper. Their work is shown below.

   **Jasmine’s Array**
   
   **Roland’s Array**

   a. Can one of the arrays be used to correctly measure the area of the piece of paper? If so, whose array would you use? Explain why.

   b. What is the area of the piece of paper? Explain your strategy for finding the area.

   c. Jasmine thinks she can skip-count by sixes to find the area of her rectangle. Is she correct? Explain why or why not.
2. Jaheim says you can create three rectangles with different side lengths using 12 unit squares. Use numbers, equations, and words to show what Jaheim is saying.

3. The area of a rectangle is 72 square units. One side has a length of 9 units. What is the other side length? Explain how you know using pictures, equations, and words.
4. Jax started to draw a grid inside the rectangle to find its area.
   
   a. Use a straight edge to complete the drawing of the grid.
   
   b. Write both an addition and a multiplication equation that you could use to find the area, then solve.

5. Half of the rectangle below has been tiled with unit squares.
   
   a. How many more unit squares are needed to fill in the rest of the rectangle?
   
   b. What is the total area of the large rectangle? Explain how you found the area.
1. Sarah says the rectangle on the left has the same area as the sum of the two on the right. Pam says they do not have the same areas. Who is correct? Explain using numbers, pictures, or words.

2. Draw three different arrays that you could make with 36 square-inch tiles. Label the side lengths on each of your arrays. Write multiplication sentences for each array to prove that the area of each array is 36 square inches.
3. Mr. and Mrs. Jackson are buying a new house. They are deciding between the two floor plans below.

Which floor plan has the greater area? Show how you found your answer on the drawings above. Show your calculations below.
4. Superior Elementary School uses the design below for their swimming pool.

![Diagram of a swimming pool with dimensions: A: 3 m x 17 m, B: 6 m x 10 m, C: 6 m x 3 m]

a. Label the side lengths of Rectangles A and B on the drawing.

b. Find the area of each rectangle.

c. Find the area of the entire pool. Explain how you found the area of the pool.
Equal Opportunity Notice
CA BOCES hereby advises students, parents, employees and the general public that it offers employment, programs and educational opportunities, including vocational education opportunities, without regard to gender, race, color, national origin, handicap or any other legally protected status. Inquiries regarding this nondiscrimination policy and grievance procedures may be directed to: Human Resources Director, Cattaraugus-Allegany BOCES, 1825 Windfall Road, Olean, NY 14760; 716-376-8237.