EUREKA MATH

A STORY OF UNITS

Mathematics Curriculum

Grade 3 • MODULE 4

Multiplication and Area

Problem Sets

Video tutorials: http://embarc.online

Version 3

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GRADE 3 • MODULE 4

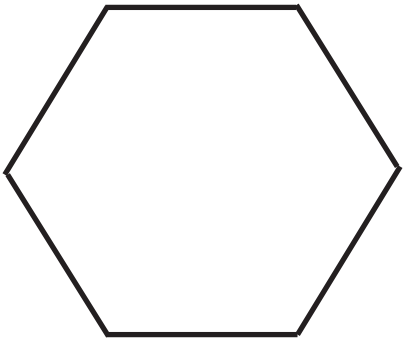
Multiplication and Area

NOTE: Student sheets should be printed at 100% scale to preserve the intended size of figures for accurate measurements. Adjust copier or printer settings to *actual size* and set page scaling to *none*.

Name _____ Date _____

1. Use 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.

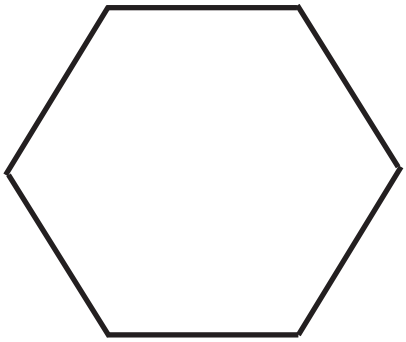
Shape A: _____ triangles



Shape B: _____ triangles

2. Use 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.

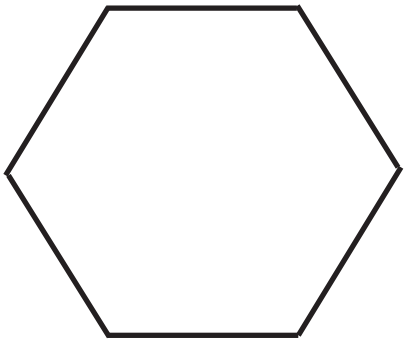
Shape A: _____ rhombuses



Shape B: _____ rhombuses

3. Use trapezoid pattern blocks to cover each shape below. Draw lines to show where the trapezoids meet. Then, write how many trapezoid pattern blocks it requires 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 square pattern blocks to cover the rectangle below. Draw lines to show where the squares meet. Then, write how many square pattern blocks it requires to cover the rectangle.

_____ squares

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

Name _____ Date _____

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

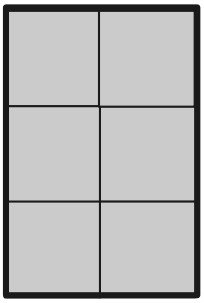
	Drawing	Area
Rectangle A		
Rectangle B		
Rectangle C		

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

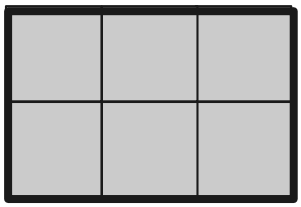
	Drawing	Area
Rectangle A		
Rectangle B		
Rectangle C		

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 square units to create these two rectangles. Do the two rectangles have the same area? How do you know?



Shape A

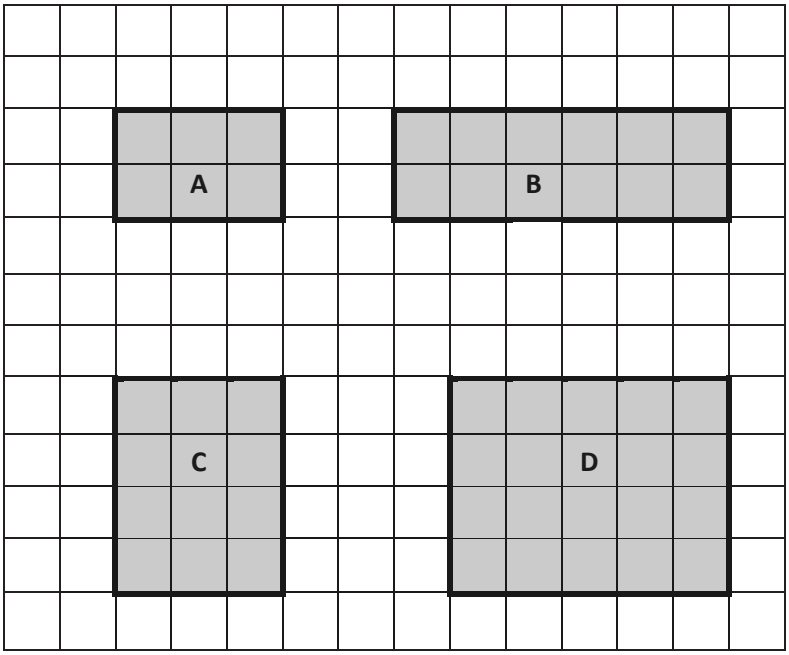


Shape B

5. Count to find the area of the rectangle below. Then, draw a different rectangle that has the same area.

Name _____ Date _____

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



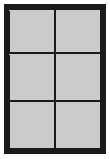
A: _____ square units

B: _____

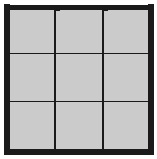
C: _____

D: _____

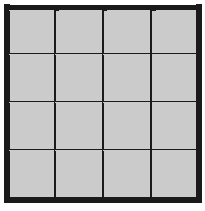
2. Each ▢ is 1 square unit. What is the area of each of the following rectangles?

a. 

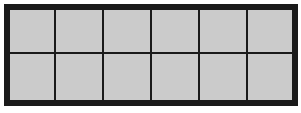
_____

b. 

_____

c. 

_____

d. 

_____

3. a. 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.

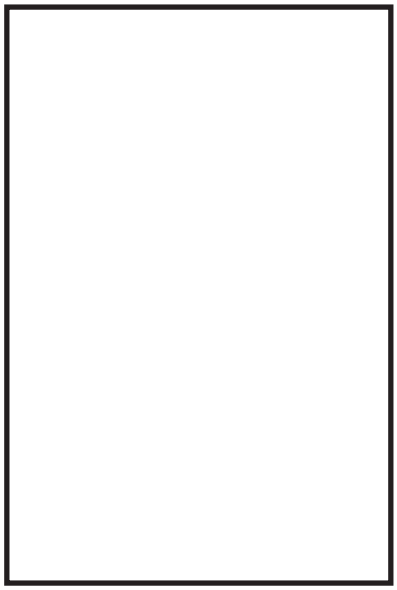
4. Use a separate piece of square centimeter grid paper. Draw four different rectangles that each has an area of 8 square centimeters.

Name _____ Date _____

1. 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.

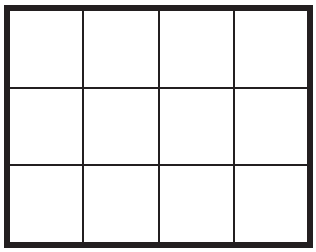
Total area: _____

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.



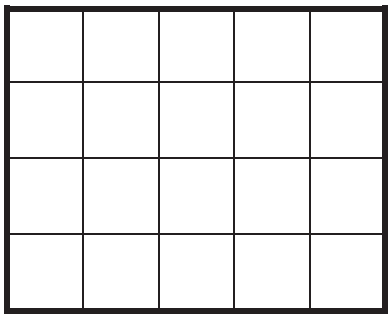
Total area: _____

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.



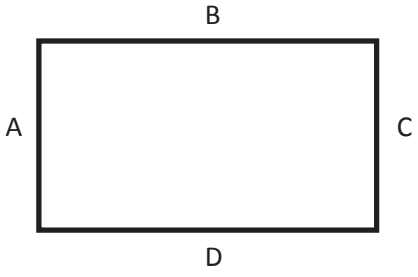
Total area: _____

4. Each  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.



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

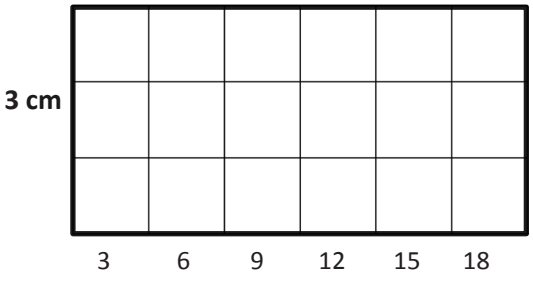
6. How does knowing side lengths A and B help you find side lengths C and D on the rectangle below?



Name _____ Date _____

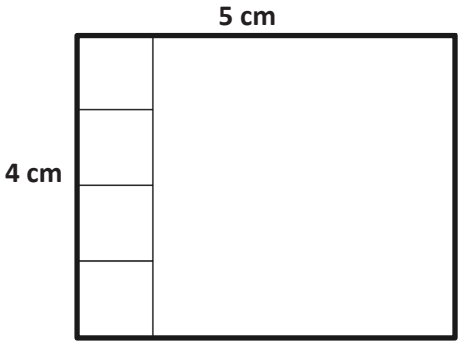
1. Use the centimeter side of a ruler to draw in the tiles, and then skip-count to find the unknown area. Write a multiplication sentence for each tiled rectangle.

a. Area: **18** square centimeters.



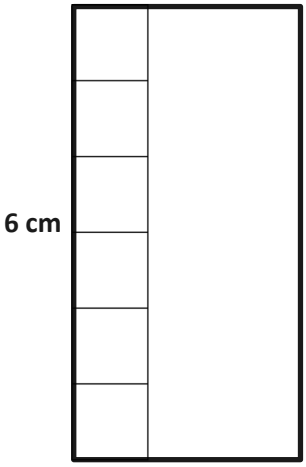
3 × _____ = 18

b. Area: _____ square centimeters.



_____ × _____ = _____

c. Area: **18** square centimeters.

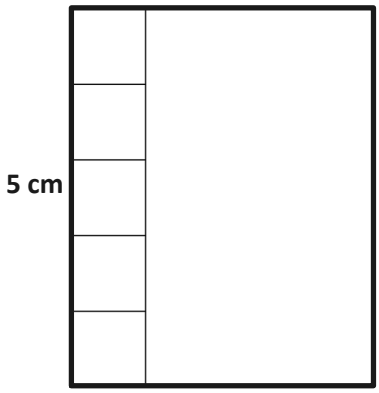


_____ × _____ = _____

d. Area: **24** square centimeters.

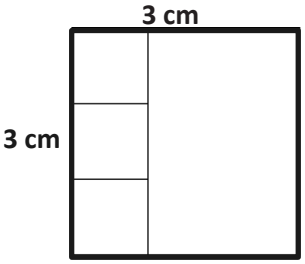
_____ × _____ = _____

e. Area: **20** square centimeters.



_____ × _____ = _____

f. Area: _____ square centimeters.



_____ × _____ = _____

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.

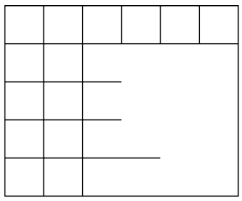
4. Leon makes a rectangle with 32 square centimeter tiles. There are 4 equal rows of tiles.

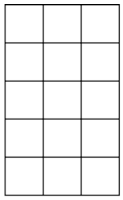
   a. How many tiles are in each row? Use words, pictures, and numbers to support your answer.

   b. Can Leon arrange all of his 32 square centimeter tiles into 6 equal rows? Explain your answer.

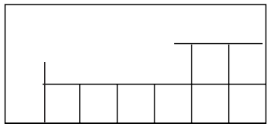
Name _____ Date _____

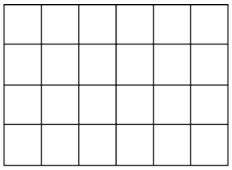
1. Each ☐ represents 1 square centimeter. Draw to find the number of rows and columns in each array. Match it to its completed array. Then, fill in the blanks to make a true equation to find each array's area.

a. 

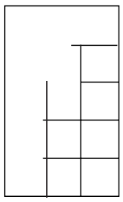


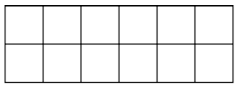
_____ cm × _____ cm = _____ sq cm

b. 

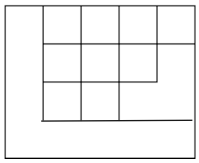


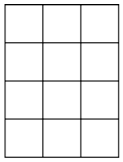
_____ cm × _____ cm = _____ sq cm

c. 

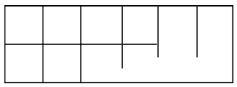


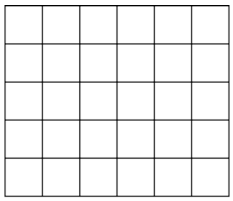
_____ cm × _____ cm = _____ sq cm

d. 

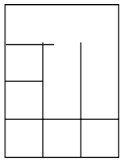


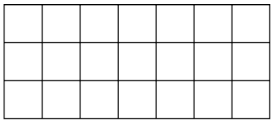
_____ cm × _____ cm = _____ sq cm

e. 



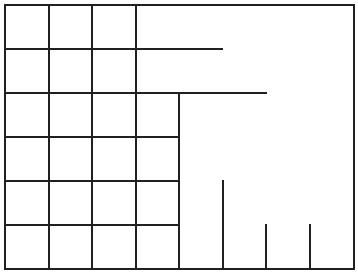
_____ cm × _____ cm = _____ sq cm

f. 

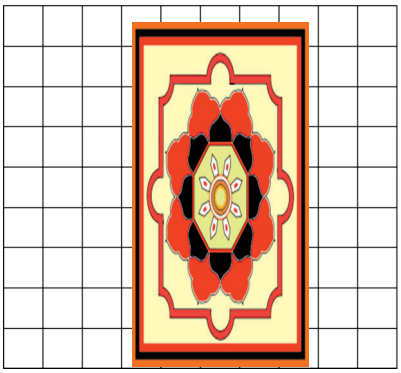


_____ cm × _____ cm = _____ sq cm

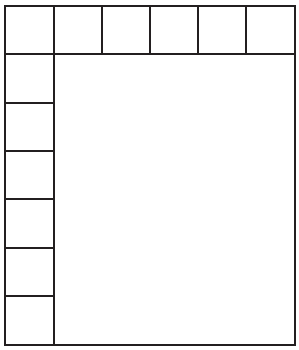
2. Sheena skip-counts by sixes to find the total square units in the rectangle below. She says there are 42 square units. Is she right? Explain your answer.



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?

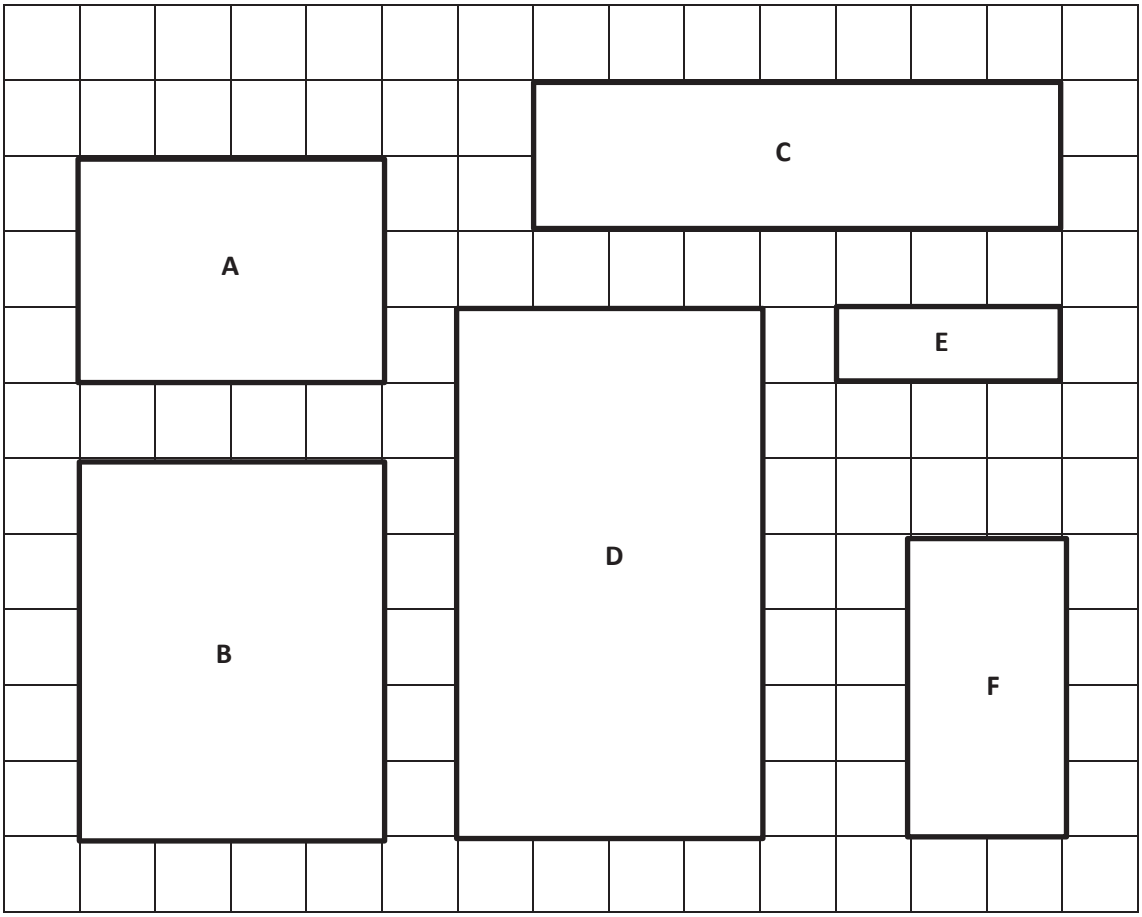


4. Abdul is creating a stained glass window with square inch glass tiles as shown below. How many more square inch glass tiles does Abdul need to finish his glass window? Explain your answer.



Name _____ Date _____

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 A:

____ units × ____ units = ____ square units

b. Area B:

____ units × ____ units = ____ square units

c. Area C:

____ units × ____ units = ____ square units

d. Area D:

____ units × ____ units = ____ square units

e. Area E:

____ unit × ____ units = ____ square units

f. Area F:

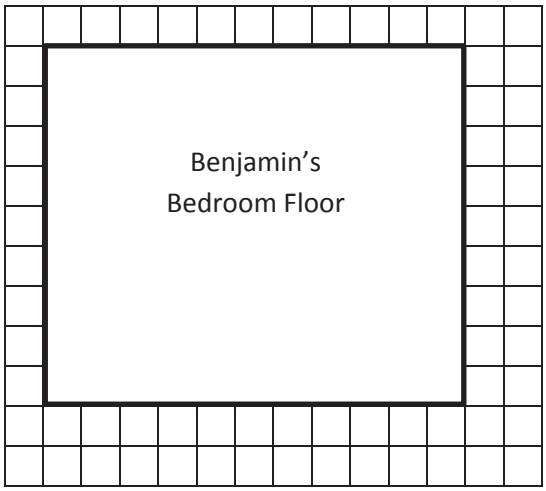
____ units × ____ units = ____ square units

2. The area of Benjamin's bedroom floor is shown on the grid to the right. Each ☐ represents 1 square foot. How many total square feet is Benjamin's floor?

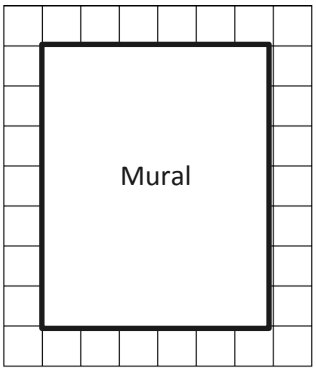
   a. Label the side lengths.

   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. Each ☐ represents 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.

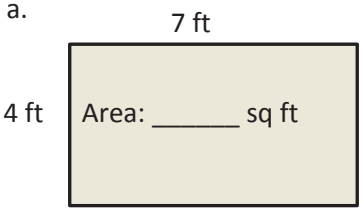
   a. Use pictures, numbers, and words to explain how Mila and Jorge can both be right.

   b. How many square units might Mrs. Barnes' array have had?

Name _____ Date _____

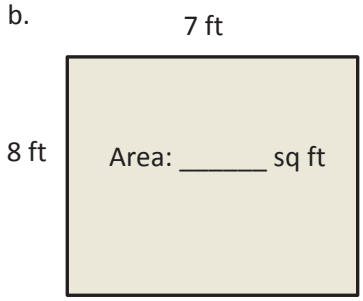
1. Write a multiplication equation to find the area of each rectangle.

a.



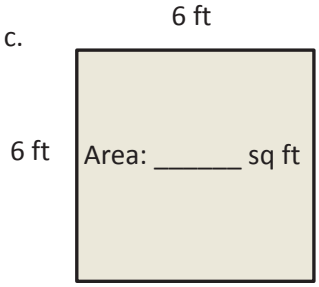
_____ × _____ = _____

b.



_____ × _____ = _____

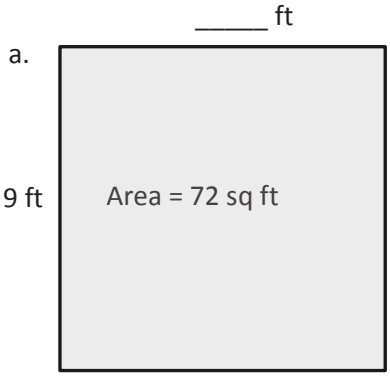
c.



_____ × _____ = _____

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

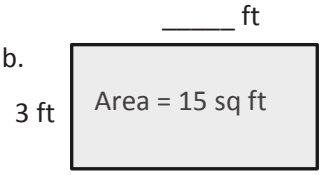
a.



_____ × _____ = _____

_____ ÷ _____ = _____

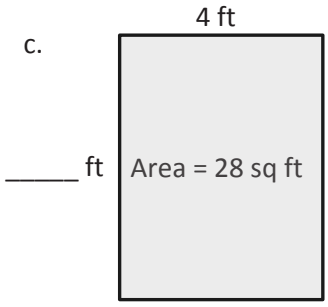
b.



_____ × _____ = _____

_____ ÷ _____ = _____

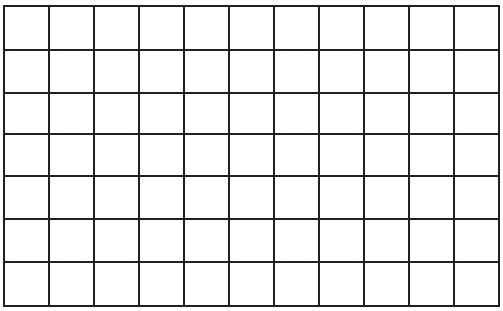
c.



_____ × _____ = _____

_____ ÷ _____ = _____

3. On the grid below, draw a rectangle that has an area of 42 square units. 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?

Name _____ Date _____

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.

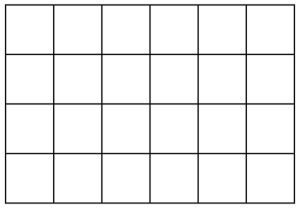
   c. Write an equation to show the total area of the 2 rectangles.

2. Place your 2 equal rectangles side by side to create a new, longer rectangle.

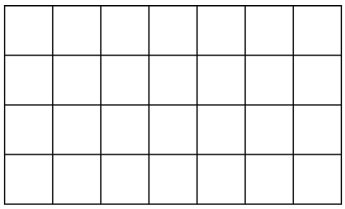
   a. Draw an area model to show the new rectangle. Label the side lengths.

   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



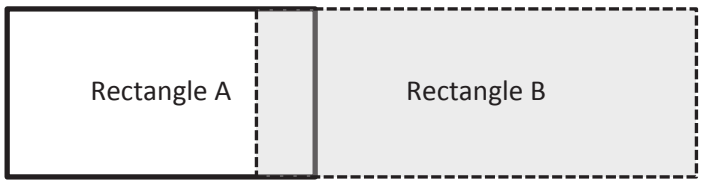
Rahema's Rectangle

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.

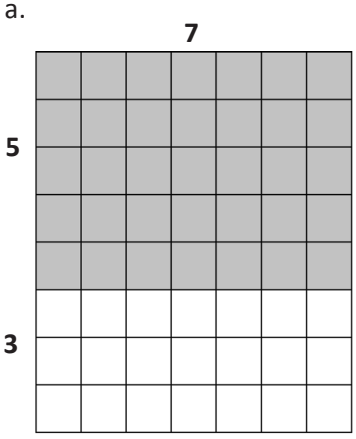
4. Kiera says she can find the area of the long rectangle below by adding the areas of Rectangles A and B. Is she right? Why or why not?



Name _____ Date _____

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

a.



$8 \times 7 = (5 + 3) \times 7$

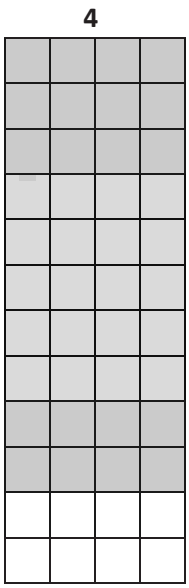
$= (5 \times 7) + (3 \times 7)$

$=$ _____ + _____

$=$ _____

Area: _____ square units

b.



$12 \times 4 = (\_\_\_\_\_ + 2) \times 4$

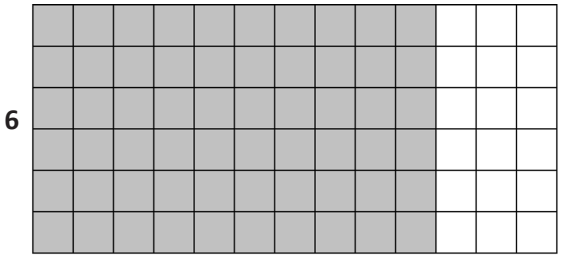
$= (\_\_\_\_\_ \times 4) + (2 \times 4)$

$=$ _____ + 8

$=$ _____

Area: _____ square units

c.



$6 \times 13 = 6 \times (\_\_\_\_\_ + 3)$

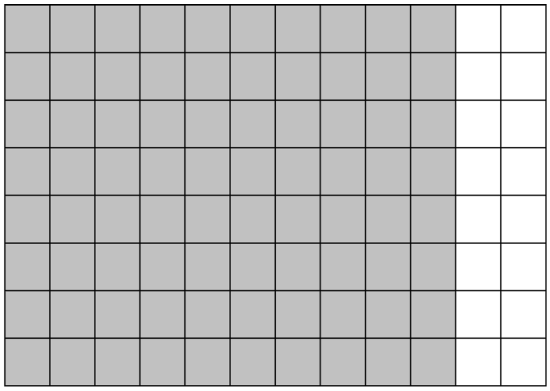
$= (6 \times \_\_\_\_\_) + (6 \times 3)$

$=$ _____ + _____

$=$ _____

Area: _____ square units

d.



$8 \times 12 = 8 \times (\_\_\_\_\_ + \_\_\_\_\_)$

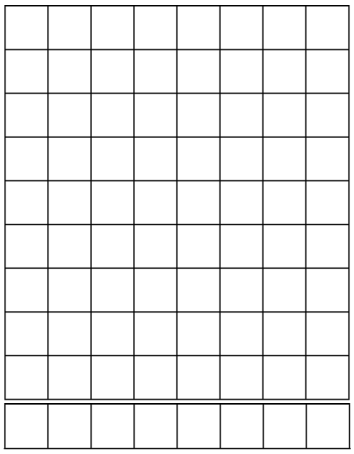
$= (8 \times \_\_\_\_\_) + (8 \times \_\_\_\_\_)$

$=$ _____ + _____

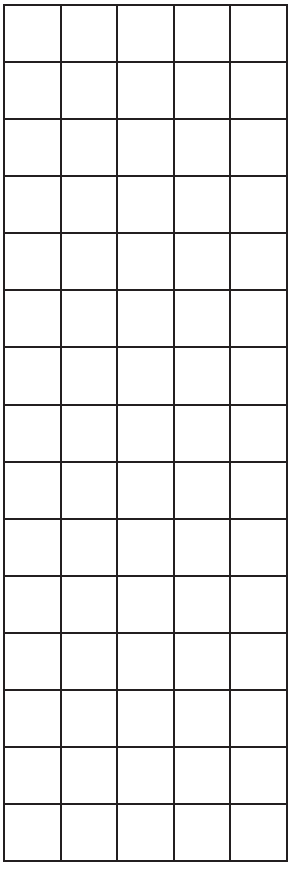
$=$ _____

Area: _____ square units

2. Vince imagines 1 more row of eight to find the total area of a 9 × 8 rectangle. Explain how this could help him solve 9 × 8.



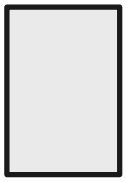
3. Break the 15 × 5 rectangle into 2 rectangles by shading one smaller rectangle within it. Then, find the sum of the areas of the 2 smaller rectangles and show how it relates to the total area. Explain your thinking.



Name _____ Date _____

1. The rectangles below have the same area. Move the parentheses to find the unknown side lengths. Then, solve.

a.



Area: 8 × _____ = _____

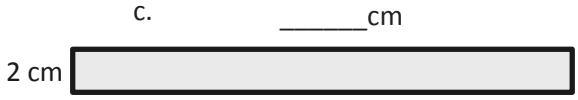
Area: _____ sq cm

b.

Area: 1 × 48 = _____

Area: _____ sq cm

c.



Area: **8 × 6** = (2 × 4) × 6

= 2 × 4 × 6

= _____ × _____

= _____

Area: _____ sq cm

d.

Area: **8 × 6** = (4 × 2) × 6

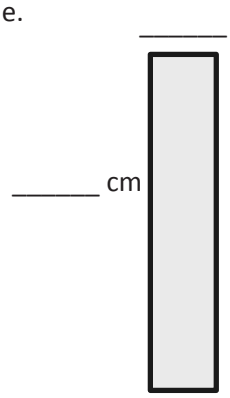
= 4 × 2 × 6

= _____ × _____

= _____

Area: _____ sq cm

e.



Area: **8 × 6** = 8 × (2 × 3)

= 8 × 2 × 3

= _____ × _____

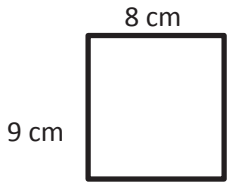
= _____

Area: _____ 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.



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

4 × 18 = 4 × 2 × 9

= 4 × 2 × 9

= _____ × _____

= _____

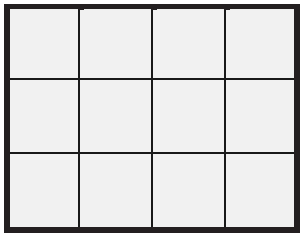
Area: _____ sq cm

c. Use the expression 8 × 9 to find different side lengths for a rectangle that has the same area as the rectangle in Part (a). Show your equations using parentheses. 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?

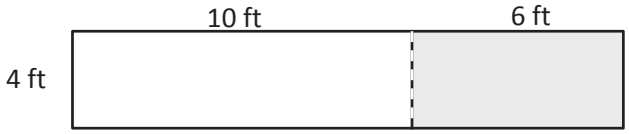
2. Stacy tiles the rectangle below using her square pattern blocks.



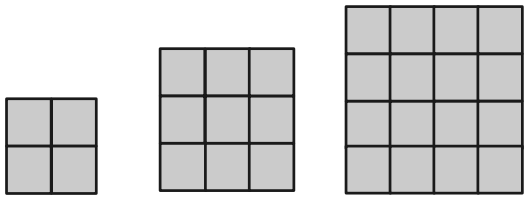
a. Find the area of Stacy's rectangle in square units. Then, draw and label a different rectangle with whole number side lengths that has the same area.

b. Can you draw another rectangle with different whole number side lengths and have the same area? Explain how you know.

3. An artist paints a 4 foot × 16 foot mural on a wall. What is the total area of the mural? Use the break apart and distribute strategy.



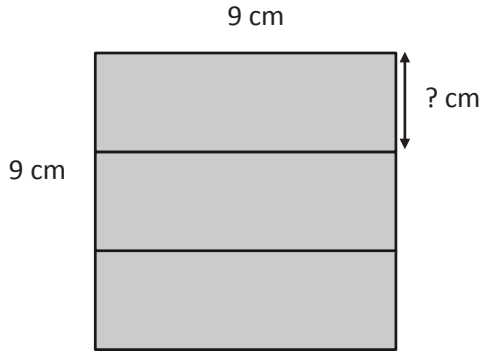
4. Alana tiles the 3 figures below. She says, "I'm making a pattern!"



a. Find the area of 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 unknown side length of 1 piece of paper. Then, find the total area of 2 pieces of paper.



Name _____ Date _____

1. Each of the following figures is made up of 2 rectangles. Find the total area of each figure.

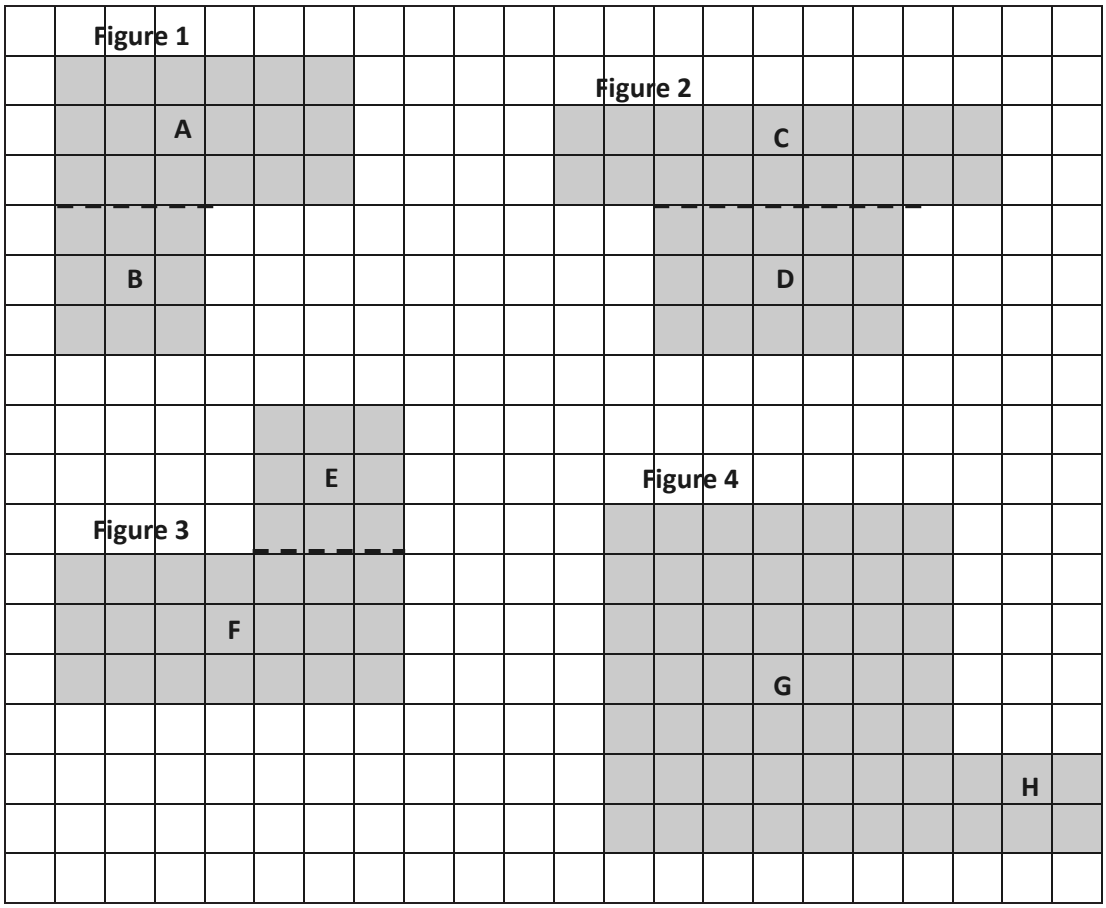


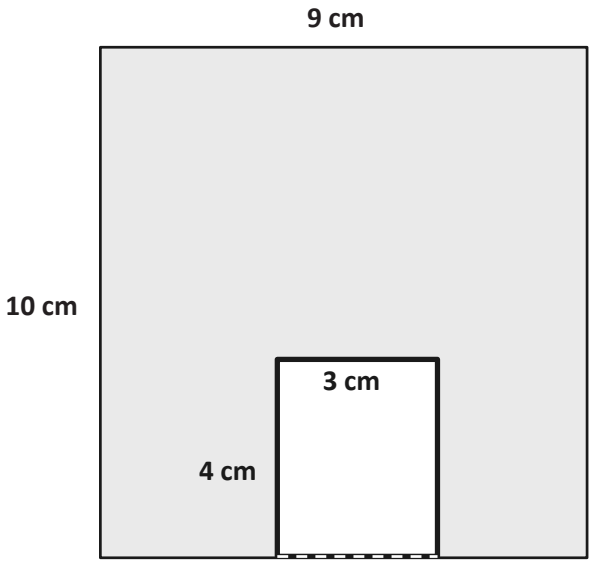
Figure 1: Area of A + Area of B: 18 sq units + _____ sq units = _____ sq units

Figure 2: Area of C + Area of D: _____ sq units + _____ sq units = _____ sq units

Figure 3: Area of E + Area of F: _____ sq units + _____ sq units = _____ sq units

Figure 4: Area of G + Area of H: _____ sq units + _____ sq units = _____sq units

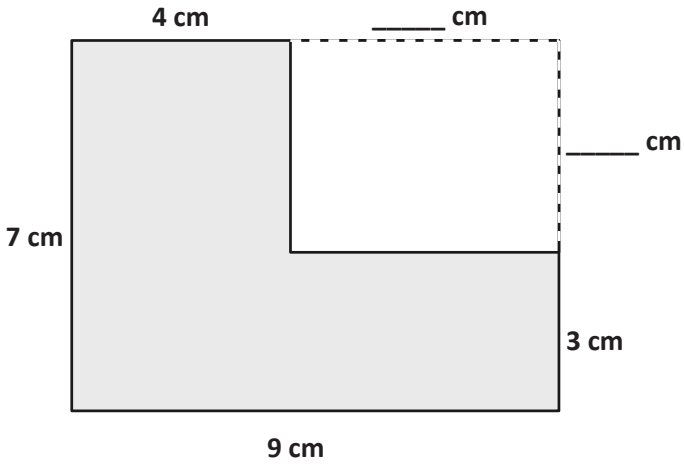
2. The figure shows a small rectangle cut out of a bigger rectangle. Find the area of the shaded figure.



Area of the shaded figure: _____ – _____ = _____

Area of the shaded figure: _____ square centimeters

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



a. Label the unknown measurements.

b. Area of the big rectangle:

_____ cm × _____ cm = _____ sq cm

c. Area of the small rectangle:

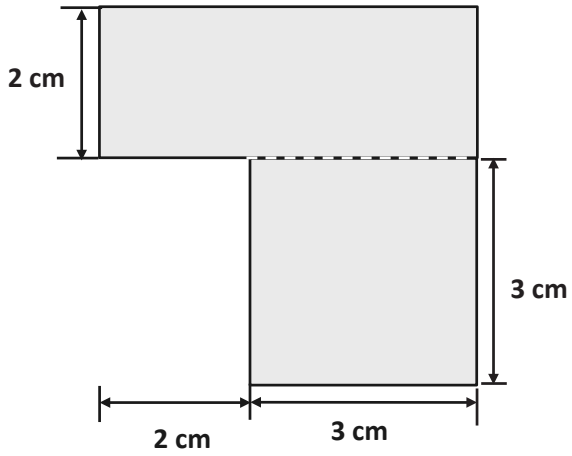
_____ cm × _____ cm = _____ sq cm

d. Find the area of the shaded figure.

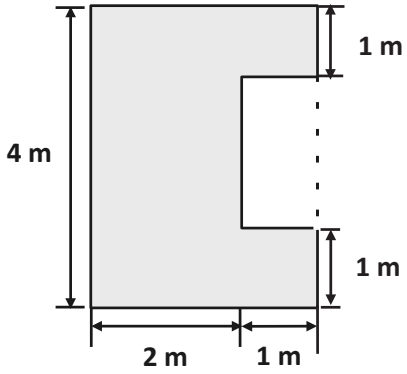
Name _____ Date _____

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

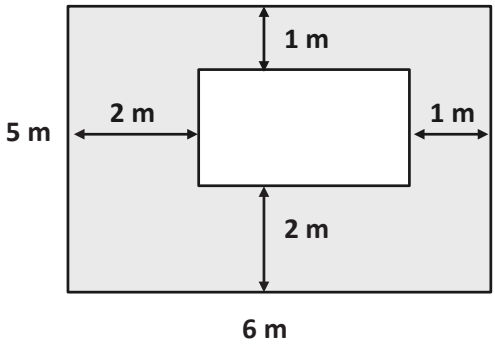
a.



b.



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



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 _____

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.

Room	Area	Strategy
Bedroom 1	_____ sq cm	
Bedroom 2	_____ sq cm	
Kitchen	_____ sq cm	
Hallway	_____ sq cm	
Bathroom	_____ sq cm	
Dining Room	_____ sq cm	
Living Room	_____ sq cm	

3. Which room has the biggest area? Was your prediction right? Why or why not?

4. 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

5. 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.

Name _____ Date _____

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.

Room	New Side Lengths
Bedroom 1: 60 sq cm	
Bedroom 2: 56 sq cm	
Kitchen: 42 sq cm	

Room	New Side Lengths
Hallway: 24 sq cm	
Bathroom: 25 sq cm	
Dining Room: 28 sq cm	
Living Room: 88 sq cm	

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