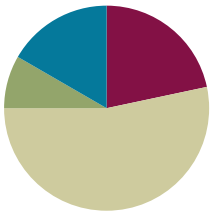
Lesson 3

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

Related Topics: More Lesson Plans for the Common Core Math

Suggested Lesson Structure

Fluency Practice	(13 minutes)
Application Problem	(5 minutes)
Concept Development	(32 minutes)
Student Debrief	(10 minutes)
Total Time	**(60 minutes)**



Fluency Practice (13 minutes)

- Find the Common Products **3.OA.7** (7 minutes)
- Count the Square Units **3.MD.6** (6 minutes)

Find the Common Products (7 minutes)

Materials: (S) Blank paper

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

T: Fold your paper in half vertically.

T: On the left half, count by threes to 30 down the side of your paper.

T: On the right half, count by sixes to 60 down the side of your paper.

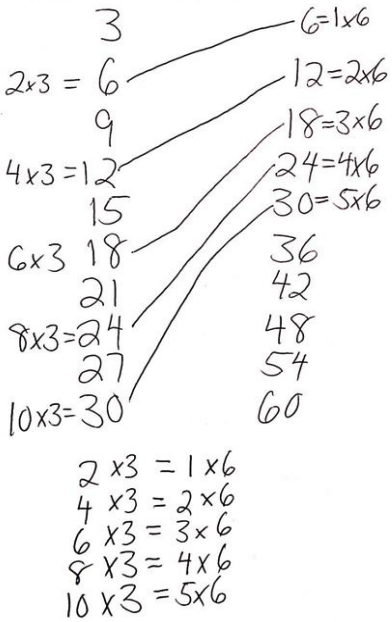
T: Draw a line to match the products that appear in both columns.

S: (Match 6, 12, 18, 24, and 30.)

T: (Write ___ × 3 = 6, ___ × 3 = 12, ___ × 3 = 18, ___ × 3 = 24, and ___ × 3 = 30 next to each matched product on the left half of the paper.) Write the equations next to their products like I did, completing the unknown factors.

S: (Write equations and complete unknowns.)

T: (Write 6 = ___ × 6, 12 = ___ × 6, 18 = ___ × 6, 24 = ___ × 6, and 30 = ___ × 6 next to each matched product on the left half of the paper.) Write the equations next to their products like I did, completing the unknown factors.



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S: (Write equations and complete unknowns.)

T: (Write 2 × 3 = ___ × 6.) Say the equation, completing the unknown factor.

S: 2 × 3 = 1 × 6.

T: (Write 2 × 3 = 1 × 6.) Write the remaining equal facts as equations.

S: (Write 4 × 3 = 2 × 6, 6 × 3 = 3 × 6, 8 × 3 = 4 × 6, and 10 × 3 = 5 × 6.)

T: What is the pattern in your equations?

S: Each multiple of 6 is also a multiple of 3.

Figures for *Count the Square Units*

Figure 1

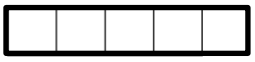


Figure 2

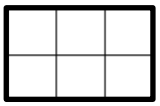


Figure 3

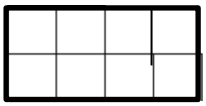


Figure 4

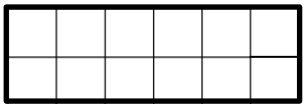
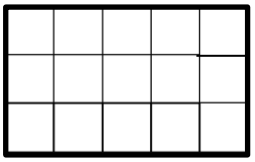


Figure 5



Count the Square Units (6 minutes)

Note: This fluency reviews finding total area using square units.

T: (Project a 1 × 5 tiled array similar to Figure 1 at right.) What's the area of the rectangle? (Pause.)

S: 5 square units.

Continue with Figures 2–5.

Application Problem (5 minutes)

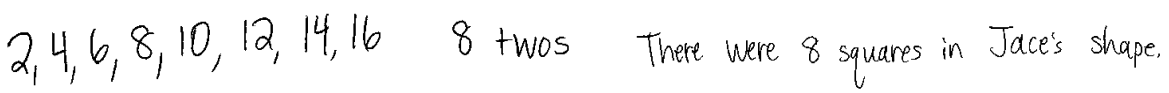
Jace uses paper squares to create a rectangle. Clary cuts all of Jace's squares in half to create triangles. She uses all the triangles to make a rectangle. There are 16 triangles in Clary's rectangle. How many squares were in Jace's shape?

Possible student solutions:

- Dividing

- Drawing a picture

- Skip-counting by twos



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Note: This problem reviews multiplying or dividing by units of 2 from G3–Module 1, depending on how students solve. Invite students to share their strategies for solving.

Concept Development (32 minutes)

Materials: (S) Square-centimeter and square-inch tiles (from G3–M4–Lesson 2), centimeter and inch grid paper, ruler, personal white board

Pass out 10 square-centimeter tiles to each student.

T: Arrange all of your square tiles in 2 equal rows to create a rectangle. Make sure the tiles are touching and don't overlap. (Allow students time to create rectangle.) What is the area of your rectangle?

S: 10 square units.

T: Is there another way you could arrange all of your tiles to make a rectangle?

S: We could make 5 rows of 2. → Or, 1 row of 10.

T: Make 1 row of 10. (Allow students time to make new rectangle.) What is the area of your rectangle now?

S: It's still 10 square units!

T: Use your ruler to measure all four sides of a tile in centimeters. (Wait for students to measure.) Can we define these units more precisely?

S: Yes, they're square centimeters! → Yes, all four sides measure 1 centimeter so they're square centimeters.

T: What is the area of your rectangle in square centimeters?

S: 10 square centimeters.

T: (Pass out centimeter grid paper.) Slip the grid paper into your personal board. Each side of the square in the grid measures 1 centimeter. How is this grid paper like the tiles we used?

S: They're both square centimeters.

T: Shade the grid paper to represent the rectangle you made with tiles.

T: Remove a tile from your rectangle, making sure your tiles all still touch to form a rectangle. (Pause.) What is the area of the rectangle now?

S: 9 square centimeters!

T: How can you change the rectangle on the grid paper to have the same area as your new tile rectangle?

S: Erase one of the squares.

NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

Offer an alternative to drawing, shading, and erasing rectangles using a marker. Some students may find it easier to represent and shade rectangles using a Smart Board or personal computer.

NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

Support English language learners as they compose their written response to Problem 3. Discussing their reasoning with a partner before writing may be advantageous. Encourage students to use *area* and *square units* in their response. Request that the student clarify, if necessary, and guide the elaboration of their ideas.

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T: Go ahead and do that. What is the area of the shaded rectangle?

S: 9 square centimeters.

Repeat this process with the inch tiles and grid paper. If time allows, students can shade a shape for a partner, who then finds the area of the shape. Then they can erase squares to create shapes with smaller areas. As students are ready, they can start to draw shapes using squares rather than just erasing them.

Problem Set (10 minutes)

Square-inch and square-centimeter grid paper are needed for some of these problems. 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)

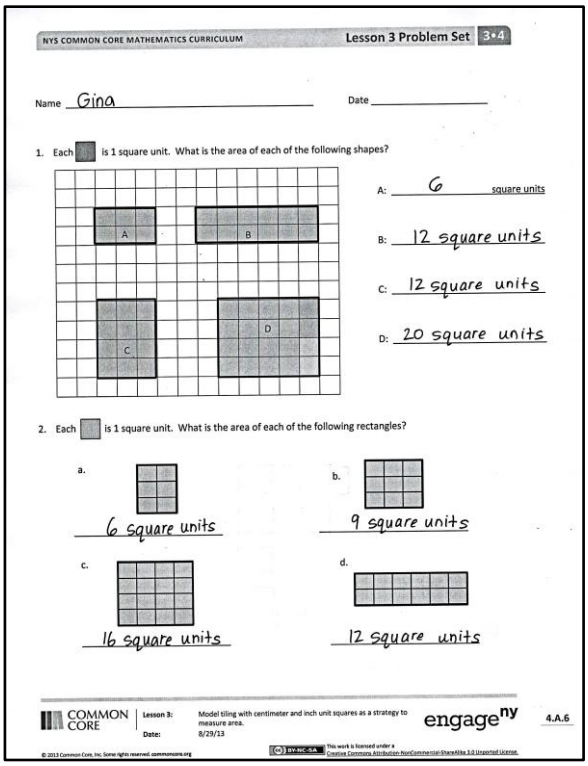
Lesson Objective: Model tiling with centimeter and inch unit squares as a strategy to measure area.

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 are the rectangles in Problems 1(b) and 1(c) the same? How are they different?
- How are the rectangles in Problems 1(a) and 2(a) the same? How are they different?
- Which rectangle in Problem 2 has the biggest area? How do you know?
- Compare the rectangles you made in Problem 4 with a partner's rectangles. How are they the same? How are they different?


NYS COMMON CORE MATHEMATICS CURRICULUM Lesson 3 Problem Set 3•4

Name Gina Date

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

A: 6 square units
B: 12 square units
C: 12 square units
D: 20 square units

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

a. 6 square units
b. 9 square units
c. 16 square units
d. 12 square units

COMMON CORE Lesson 3: Model tiling with centimeter and inch unit squares as a strategy to measure area. Date: 8/29/13 engage^ny 4.A.6

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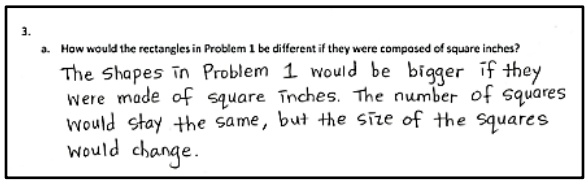
Exit Ticket (3 minutes)

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.

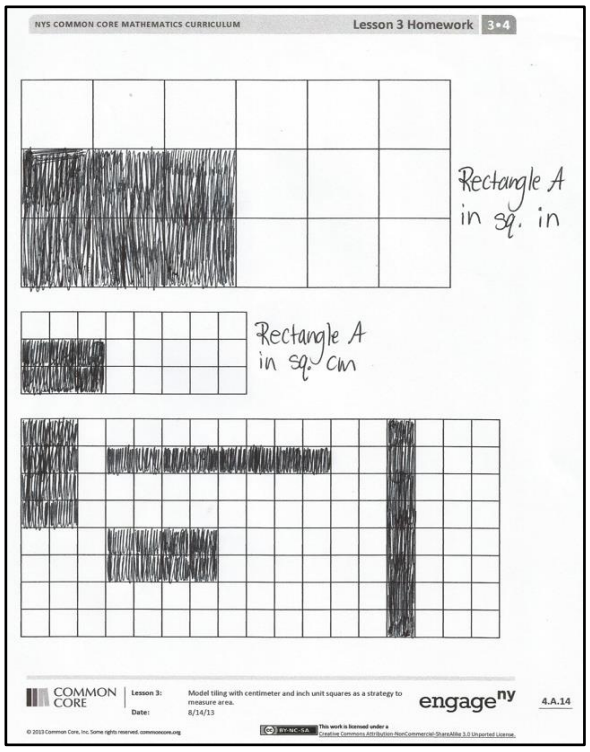


3.

a. How would the rectangles in Problem 1 be different if they were composed of square inches?

The shapes in Problem 1 would be bigger if they were made of square inches. The number of squares would stay the same, but the size of the squares would change.

Examples of Problems 3(b) and 4



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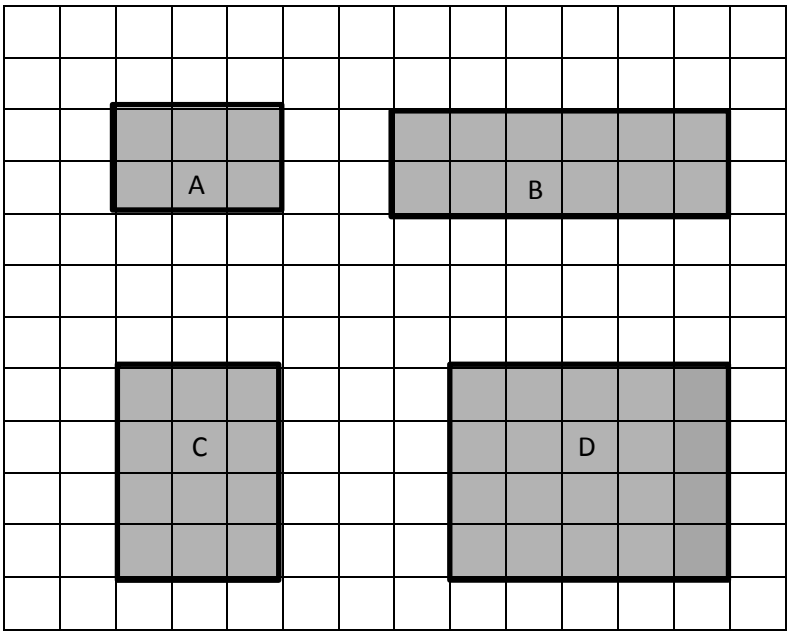
Name _____ Date _____

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



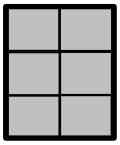
A: _____ square units

B: _____

C: _____

D: _____

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

a. 

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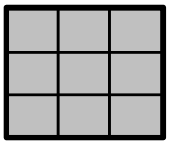
b. 

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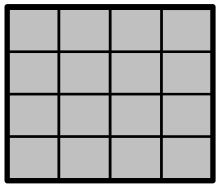
c. 

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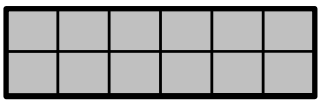
d. 

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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.

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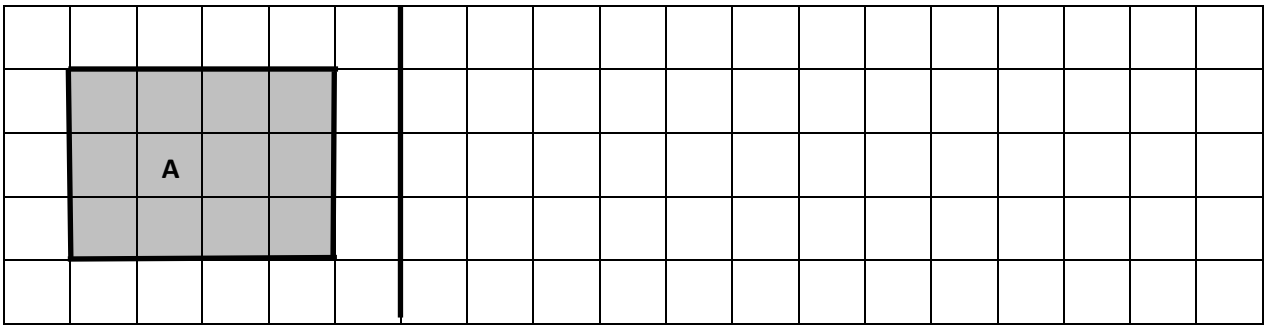
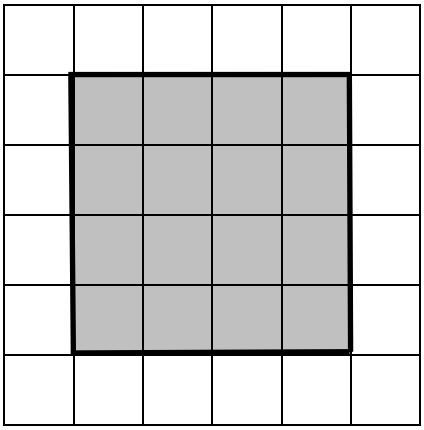
Name _____ Date _____

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



Area = _____

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



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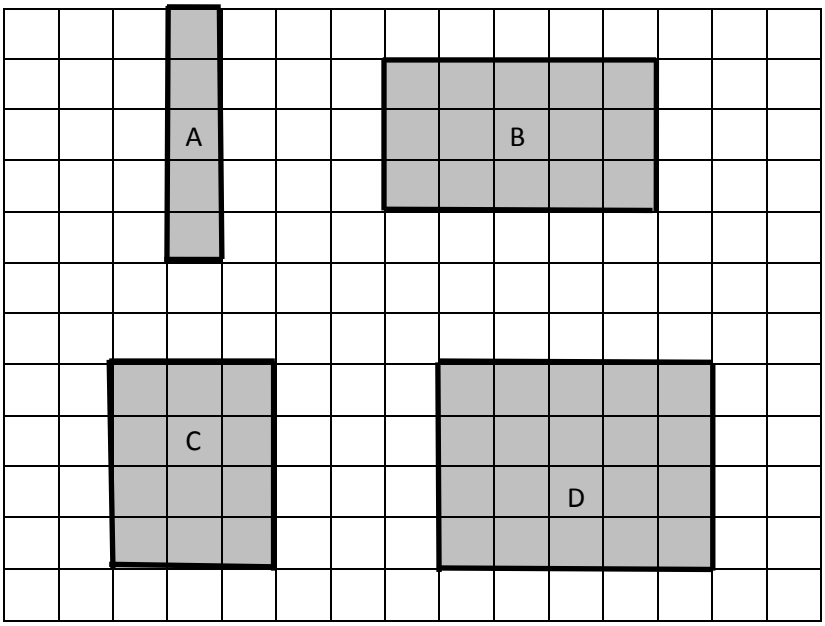
Name _____ Date _____

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



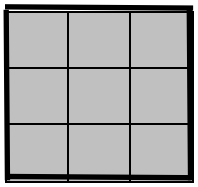
A: _____ square units

B: _____

C: _____

D: _____

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

a. 

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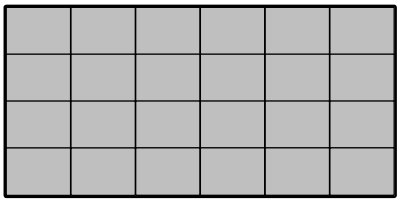
b. 

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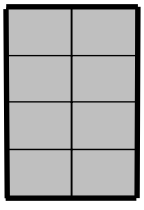
c. 

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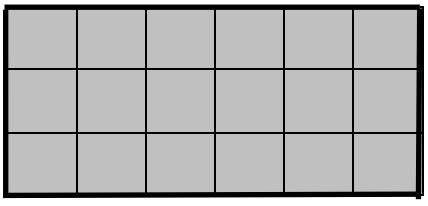
d. 

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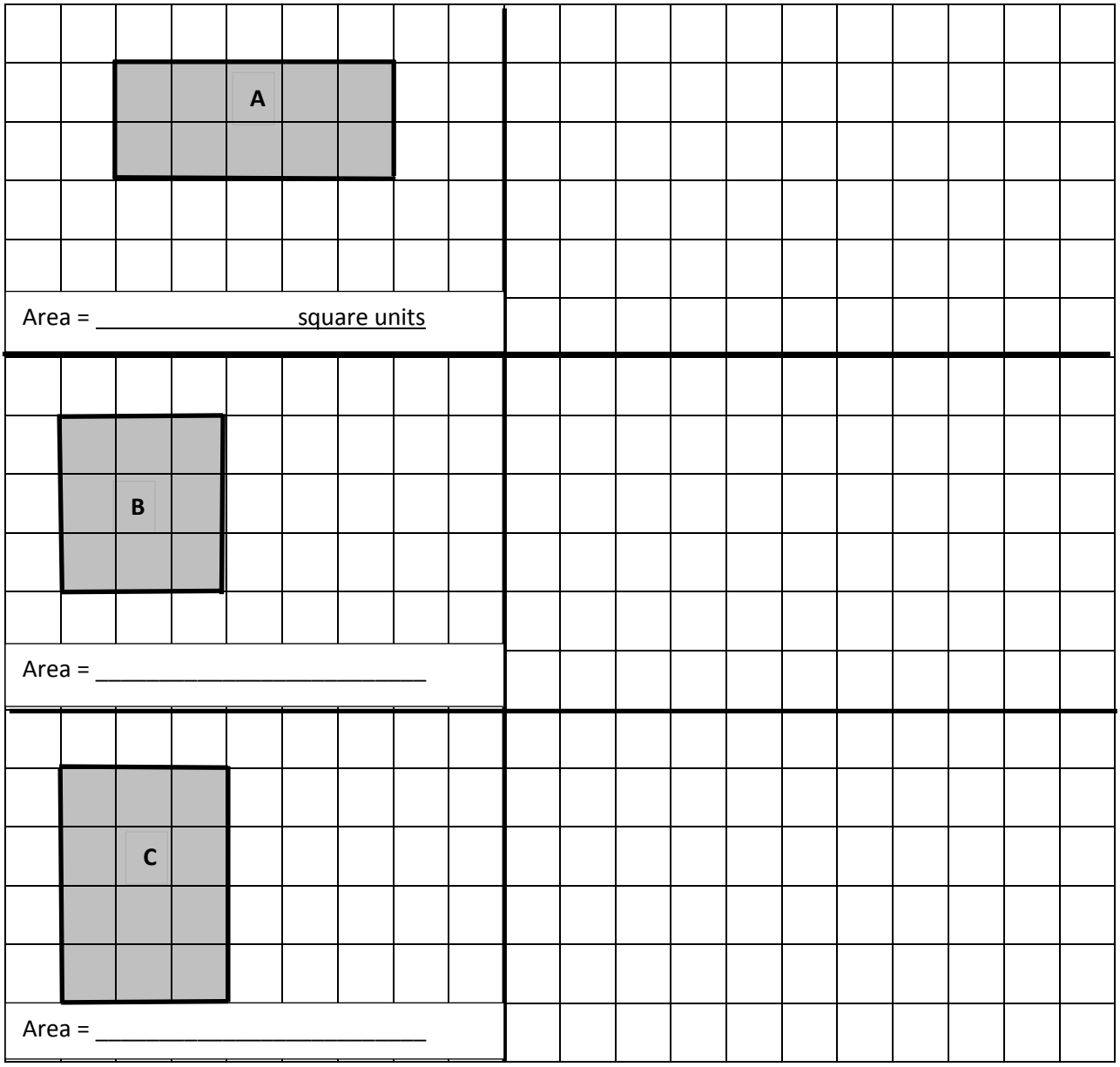
3. Each ☐ is 1 square unit. Write the area of each rectangle. Then draw another rectangle with the same area in the space provided.



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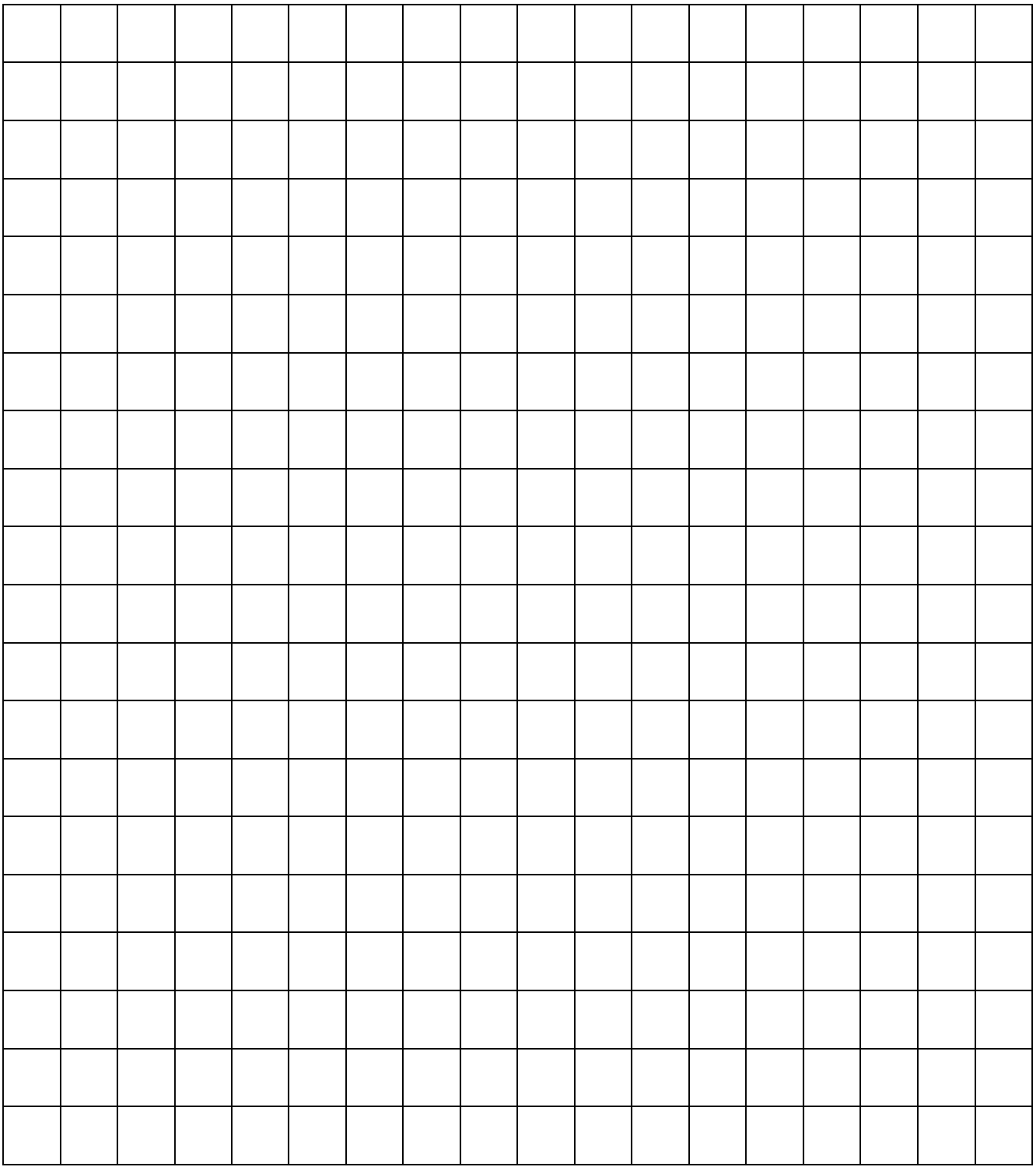

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