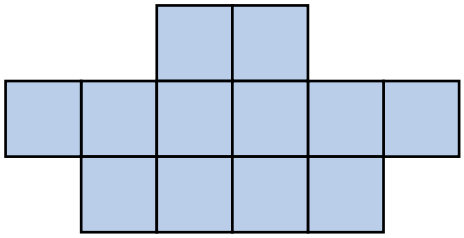
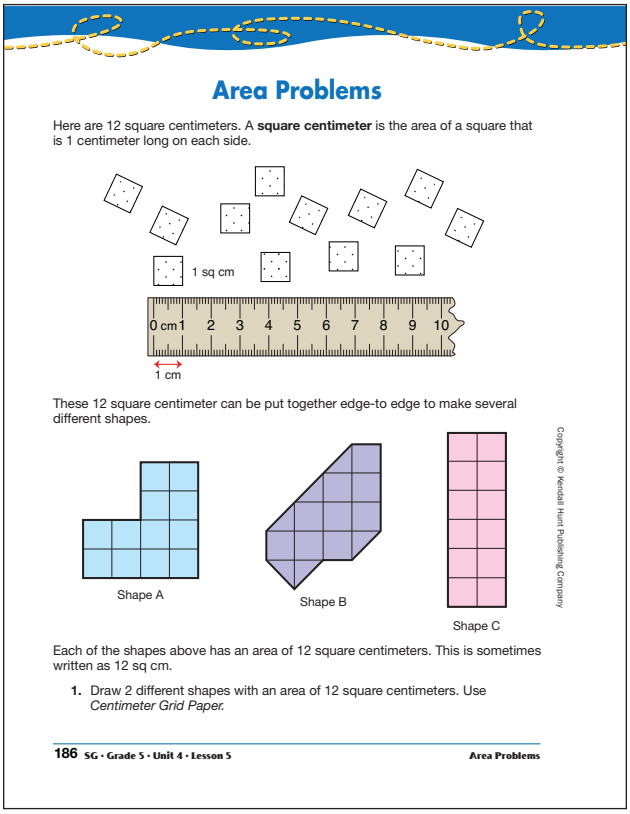
Student Guide

Area Problems (SG pp. 186–187)
Questions 1–3

1. Shapes will vary. Sample shape with an area of 12 sq cm:



2. **A.*** 7 squares
   B.* 4 rows
   C.* 28 sq cm
3. 3 rows of 9 squares is 27 sq cm.



Area Problems

Here are 12 square centimeters. A **square centimeter** is the area of a square that is 1 centimeter long on each side.

1 sq cm

0 cm 1 2 3 4 5 6 7 8 9 10

1 cm

These 12 square centimeter can be put together edge-to edge to make several different shapes.

Shape A Shape B Shape C

Each of the shapes above has an area of 12 square centimeters. This is sometimes written as 12 sq cm.

1. Draw 2 different shapes with an area of 12 square centimeters. Use *Centimeter Grid Paper.*

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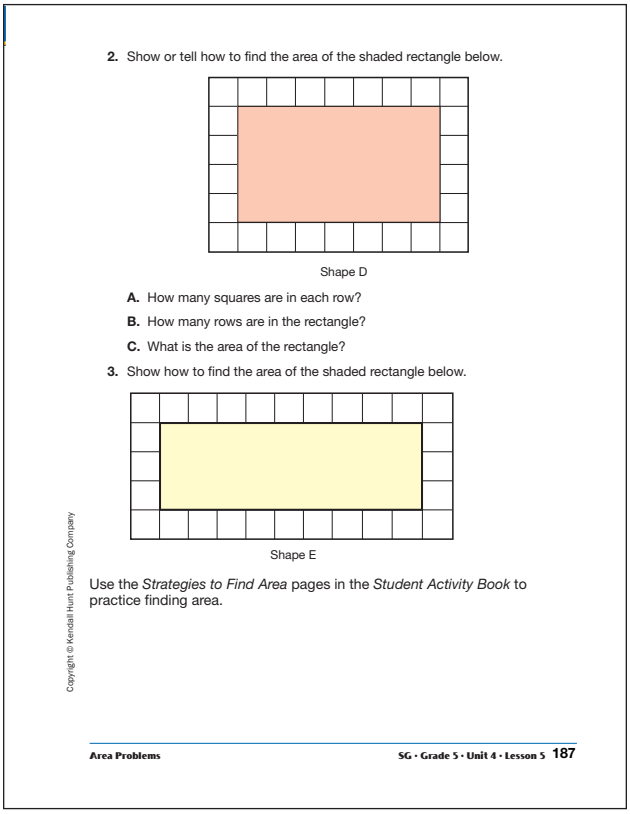

2. Show or tell how to find the area of the shaded rectangle below.

Shape D

A. How many squares are in each row?
B. How many rows are in the rectangle?
C. What is the area of the rectangle?

3. Show how to find the area of the shaded rectangle below.

Shape E

Use the *Strategies to Find Area* pages in the *Student Activity Book* to practice finding area.

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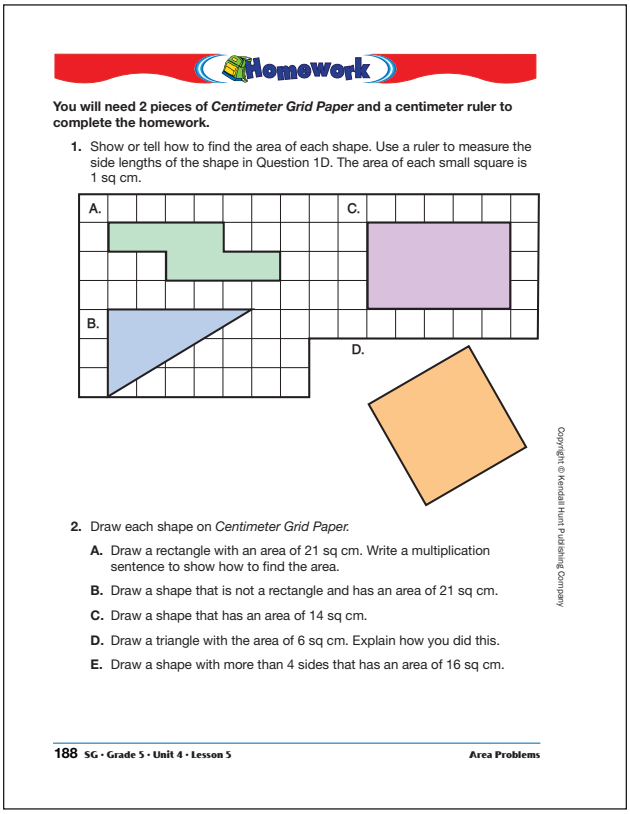
***Answers and/or discussion are included in the lesson.**



Homework

You will need 2 pieces of *Centimeter Grid Paper* and a centimeter ruler to complete the homework.

1. Show or tell how to find the area of each shape. Use a ruler to measure the side lengths of the shape in Question 1D. The area of each small square is 1 sq cm.

A.

C.

B.

D.

2. Draw each shape on *Centimeter Grid Paper.*
   - **A.** Draw a rectangle with an area of 21 sq cm. Write a multiplication sentence to show how to find the area.
   - **B.** Draw a shape that is not a rectangle and has an area of 21 sq cm.
   - **C.** Draw a shape that has an area of 14 sq cm.
   - **D.** Draw a triangle with the area of 6 sq cm. Explain how you did this.
   - **E.** Draw a shape with more than 4 sides that has an area of 16 sq cm.

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Homework (SG p. 188)
Questions 1–2

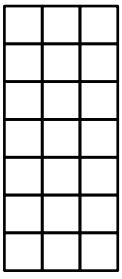
1. **A.** 8 sq cm; Strategies will vary. One possible strategy is to divide the shape into several rectangles and find the area of each rectangle. 2 cm × 1 cm + 2 cm × 2 cm + 2 cm × 1 cm = 8 sq cm

   B. 7.5 sq cm; Strategies will vary. One possible strategy is to find the area of the rectangle two of the triangles will make and divide that area in half. 5 cm × 3 cm ÷ 2 = 7.5 sq cm

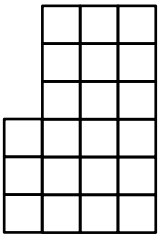
   C. 15 sq cm; Strategies will vary. One possible strategy is to find the area by multiplying length times width. 3 cm × 5 cm = 15 sq cm

   D. 16 sq cm; Strategies will vary. Length × width is 4 cm × 4 cm = 16 sq cm.

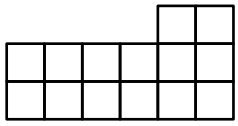
2. **A.** Rectangles will vary. One possible rectangle is shown. 7 cm × 3 cm = 21 sq cm.



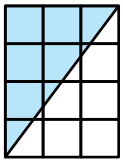
   B. Shapes will vary. One possible shape is shown.



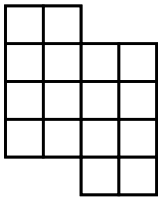
   C. Shapes will vary. One possible shape is shown.



   D. Explanations will vary. One possible solution is shown where the triangle has half the area of the 12 sq cm rectangle.



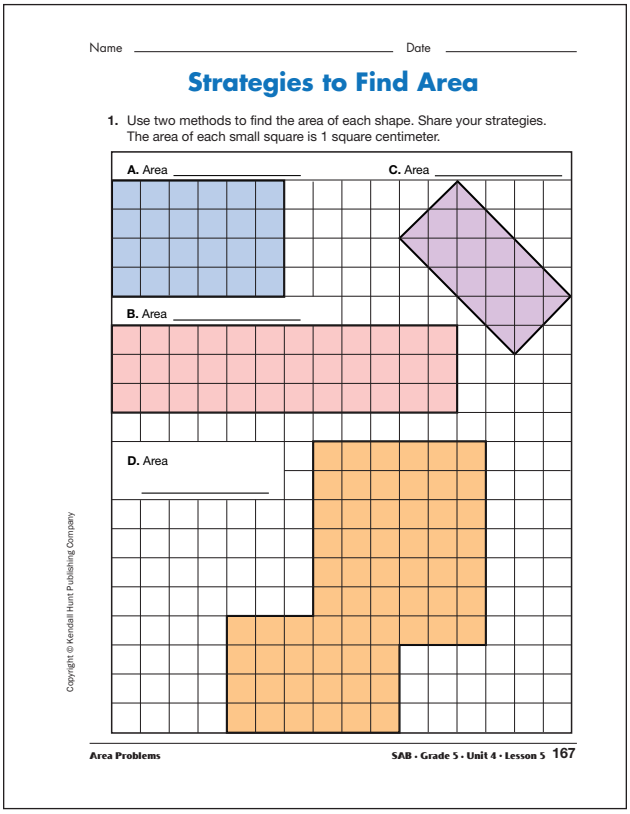
   E. Shapes will vary. One possible shape is shown.



Student Activity Book

Strategies to Find Area (SAB pp. 167–170)
Questions 1–5

1. **A.** 24 sq cm
   B. 36 sq cm
   C.* 16 sq cm
   D.* 63 sq cm
2. **A.** $3 \times 5 = 15$ sq cm
   B. $7 \times 4 = 28$ sq cm
   C. $5 \times 7 = 35$ sq cm
   D. $3 \times 9 = 27$ sq cm
   E.* $2.5 \times 6 = 15$ sq cm


Name _____ Date _____

Strategies to Find Area

1. Use two methods to find the area of each shape. Share your strategies. The area of each small square is 1 square centimeter.

A. Area _____ C. Area _____

B. Area _____

D. Area _____

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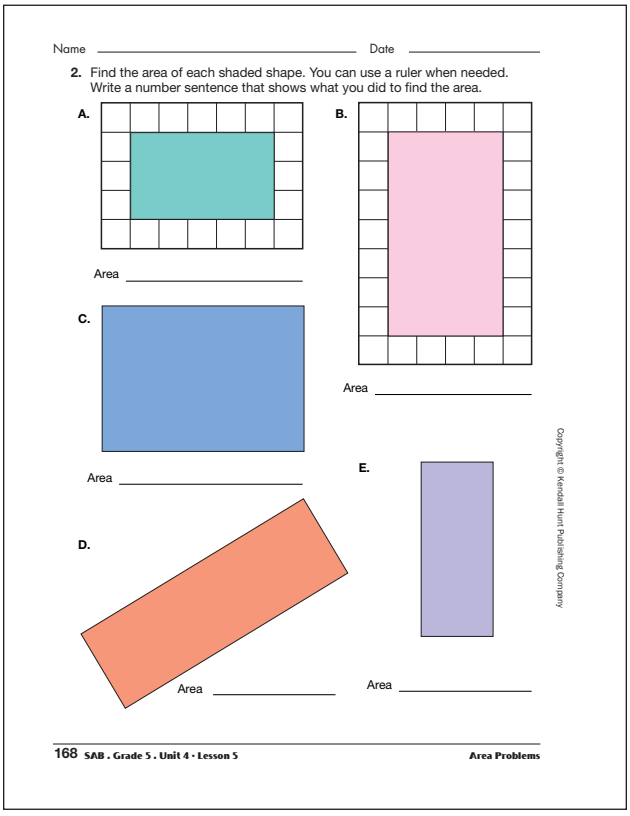
***Student Activity Book* - Page 167**


Name _____ Date _____

2. Find the area of each shaded shape. You can use a ruler when needed. Write a number sentence that shows what you did to find the area.

A. Area _____

B. Area _____

C. Area _____

D. Area _____

E. Area _____

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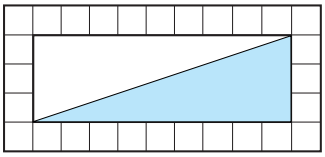
***Answers and/or discussion are included in the lesson.**

Name _____ Date _____

3. Show how to find the area of the shaded triangle.



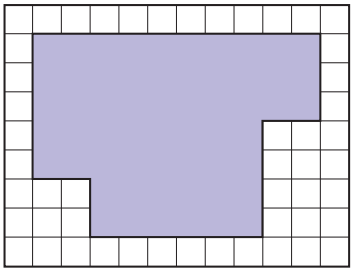
A. Find the area of the shaded triangle and white triangle together.

Area _____

B. Find the area of one triangle.

Area _____

4. Show how to find the area of the shaded shape.



Area _____

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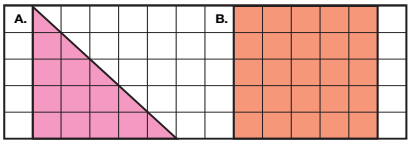
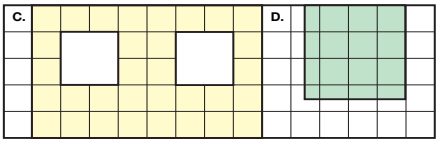
Name _____ Date _____

✓ Check-In: Question 5

5. Show and tell how to find the area of each shape.



Area _____ Area _____



Area _____ Area _____

***Student Activity Book* - Page 170**

3. A.* $3 \times 9 = 27$ sq cm

B.* $3 \times 9 = 27$ sq cm; $27 \div 2 = 13.5$ sq cm

4.* Possible strategy:

$2 \times 3 = 6$ sq cm;
$7 \times 6 = 42$ sq cm;
$2 \times 5 = 10$ sq cm;
6 sq cm + 42 sq cm + 10 sq cm = 58 sq cm

5. A. 12.5 sq cm; The triangle has one-half the area of the square in Question B.

B. 25 sq cm; The square has double the area of the triangle in Question A.

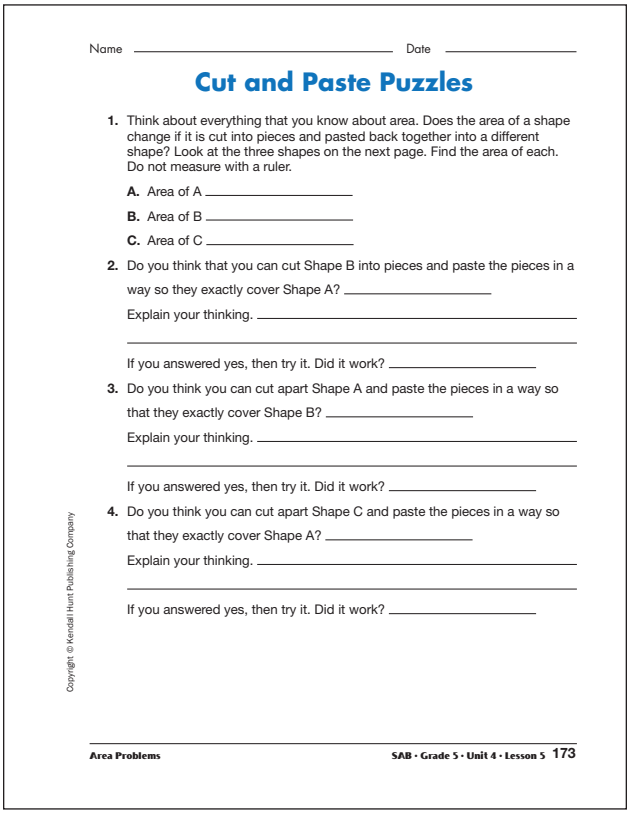
C. Possible response: 32 sq cm; The rectangle's area is $5 \times 8 = 40$ sq cm. I subtracted the area of each square ($2 \times 2 = 4$ sq cm) to find the area of the shape. $40 - 8 = 32$ sq cm.

D. $12\frac{1}{4}$ sq cm; 6 half-square centimeters is 3 whole square centimeters.
$3 + 9 + \frac{1}{4} = 12\frac{1}{4}$ sq cm.

*Answers and/or discussion are included in the lesson.

Cut and Paste Puzzles (SAB pp. 173–175)
Questions 1–4

1. **A.*** 36 sq cm
   B.* 36 sq cm
   C. 32 sq cm
2. * Yes, Shape A and B have the same area.
3. * Yes, Shape A and B have the same area.
4. No, Shape C has an area of 32 sq cm while Shape A has an area of 36 sq cm.



Name _____ Date _____

Cut and Paste Puzzles

1. Think about everything that you know about area. Does the area of a shape change if it is cut into pieces and pasted back together into a different shape? Look at the three shapes on the next page. Find the area of each. Do not measure with a ruler.
   - **A.** Area of A _____
   - **B.** Area of B _____
   - **C.** Area of C _____
2. Do you think that you can cut Shape B into pieces and paste the pieces in a way so they exactly cover Shape A? _____
   Explain your thinking. _____
   If you answered yes, then try it. Did it work? _____
3. Do you think you can cut apart Shape A and paste the pieces in a way so that they exactly cover Shape B? _____
   Explain your thinking. _____
   If you answered yes, then try it. Did it work? _____
4. Do you think you can cut apart Shape C and paste the pieces in a way so that they exactly cover Shape A? _____
   Explain your thinking. _____
   If you answered yes, then try it. Did it work? _____

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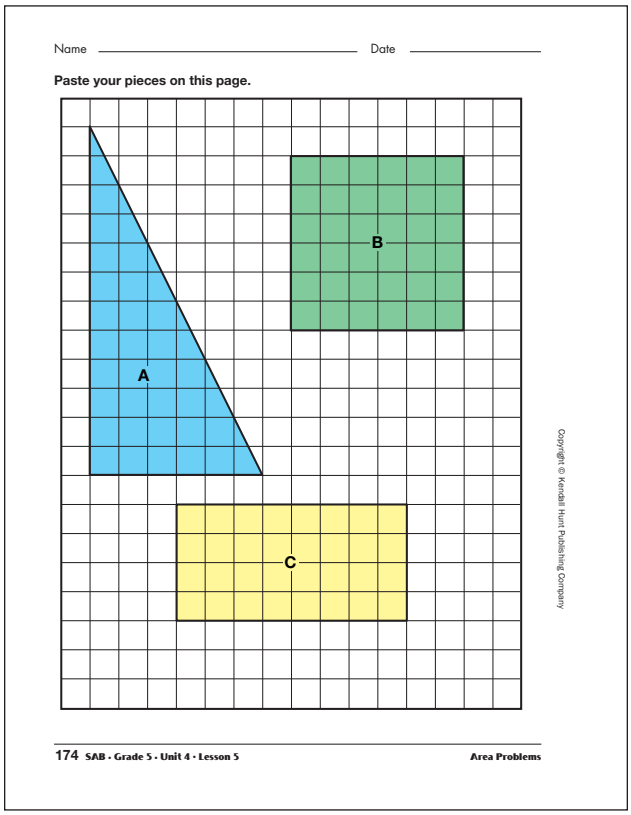

Name _____ Date _____

Paste your pieces on this page.

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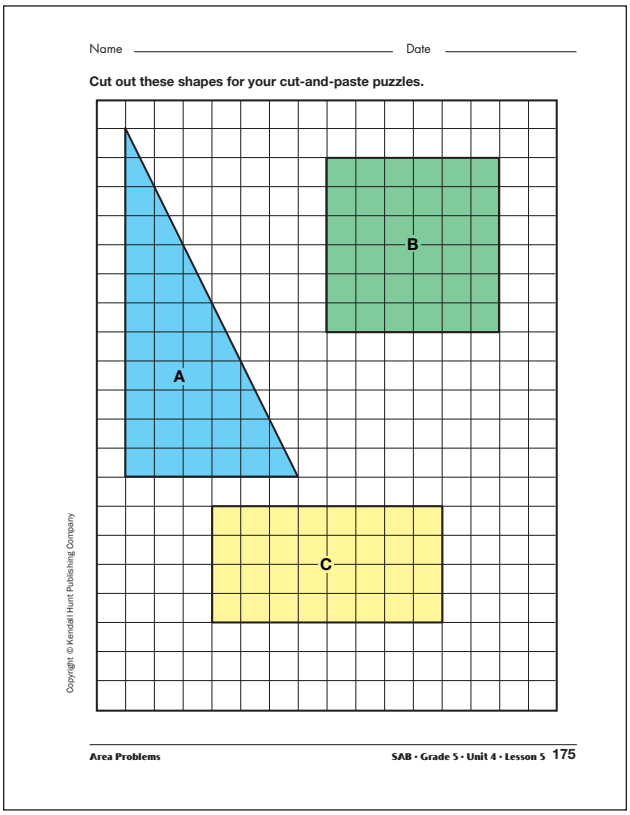
Student Activity Book **- Page 174**



Name _____ Date _____

Cut out these shapes for your cut-and-paste puzzles.

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***Answers and/or discussion are included in the lesson.**

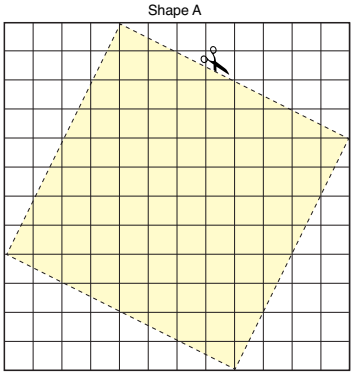
Name _____ Date _____

Super Challenge:
Cut and Paste Puzzle

1. Challenge: Find the area of Shape A below and Shape B on the following page. Do not measure with a ruler.
   - **A.** Area of Shape A = _____
   - **B.** Area of Shape B = _____
2. Can you cut apart Shape A to cover Shape B exactly? _____
   Explain. _____

If so, cut Shape A into as few pieces as possible and paste them to cover Shape B.

Shape A

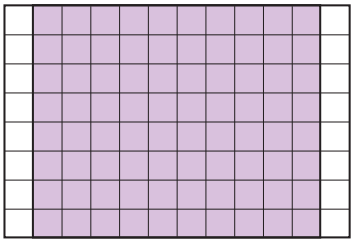


Master TG • Grade 5 • Unit 4 • Lesson 5 1

***Teacher Guide* - Page 1**

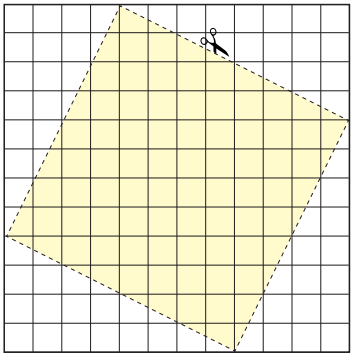
Name _____ Date _____

Shape B



A second copy of Shape A is here if you need to start over.

Shape A



2 TG • Grade 5 • Unit 4 • Lesson 5 Master

***Teacher Guide* - Page 2**

Teacher Guide

Super Challenge: Cut and Paste Puzzle (TG pp. 1–2)
Questions 1–2

1. **A.** 80 sq cm. To find the area of the shaded square, you can subtract the area of the four unshaded triangles from the area of the large square. The area of the large square is 12 cm × 12 cm = 144 sq cm. The four unshaded triangles are the same size. If two triangles are put together, a 4 × 8 = 32 sq cm rectangle results, so the area of one triangle is 16 sq cm. Thus, the four unshaded triangles combined have an area of 64 sq cm. The area of the shaded square is 144 – 64 = 80 sq cm.

   Note that if students measure the sides of the shaded rectangle directly, they are likely to conclude that its area is 9 × 9 = 81 sq cm. But the sides are a little less than 9 cm, so this is incorrect.

   B. 80 sq cm

2. Yes, Shape A and Shape B have the same area. If students cut out the pieces as shown below, they will find that the areas are equivalent. (For a rough check, students can measure Shape A. Its length and width are between 8.9 cm and 9 cm. 8.9 × 8.9 = 79.2 sq cm and 9 × 9 = 81 sq cm. Therefore, the area is between 79.2 and 81 sq cm.)