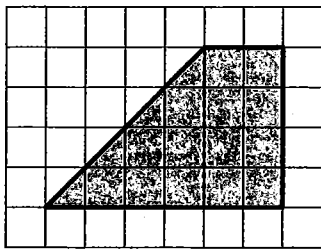


## Lesson 7 Practice Problems

### Problem 1

To decompose a quadrilateral into two identical shapes, Clare drew a dashed line as shown in the diagram.



- a. She said that the two resulting shapes have the same area. Do you agree? Explain your reasoning.

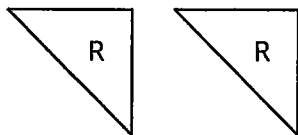
- b. Did Clare partition the figure into two identical shapes? Explain your reasoning.

### Possible Solutions

- a. Yes, the rectangle is 2 units by 4 units, so it has an area of 8 square units. The triangle is half of a 4-by-4 square, so its area is also 8 square units.
- b. No, although the shapes have the same area, they are not identical shapes—one is a rectangle and the other a triangle.

### Problem 2

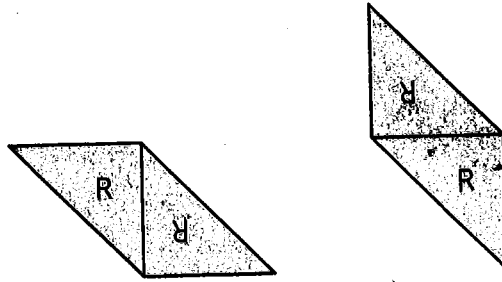
Triangle R is a right triangle. Can we use two copies of Triangle R to compose a parallelogram that is not a square?



If so, explain how or sketch a solution. If not, explain why not.

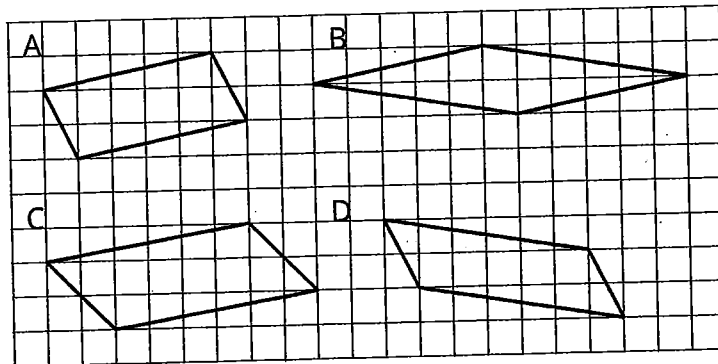
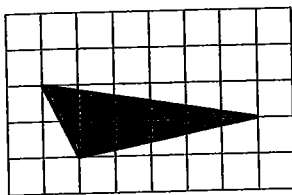
### Possible Solutions

Yes, we can use two right triangles R to compose a parallelogram that is not a square by joining them along one of the shorter sides (the sides that make the right angle).



### Problem 3

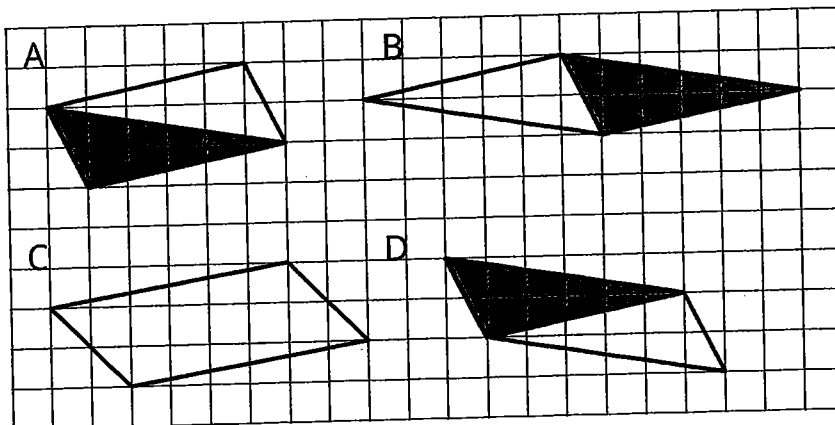
Two copies of this triangle are used to compose a parallelogram. Which parallelogram *cannot* be a result of the composition? If you get stuck, consider using tracing paper.



### Possible Solutions

C.

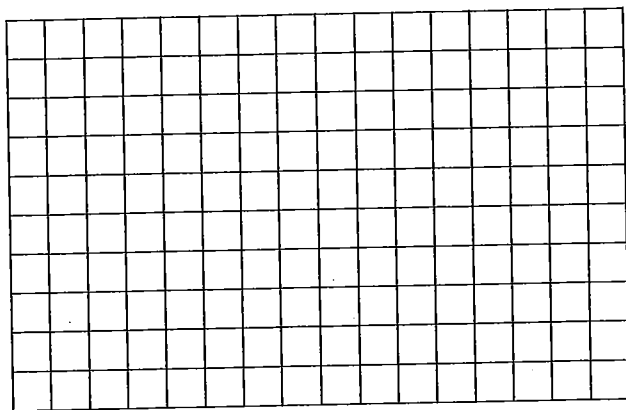
The diagram here shows how the original triangle and its copy can be composed into A, B, and D.



## Lesson 7 Practice Problems

### Problem 4

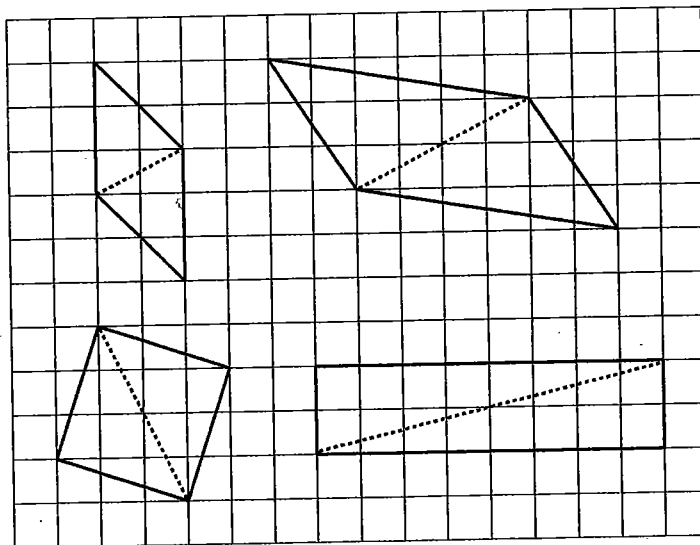
a. On the grid, draw at least three different quadrilaterals that can each be decomposed into two identical triangles with a single cut (show the cut line). One or more of the quadrilaterals should have non-right angles.



b. Identify the type of each quadrilateral.

### Possible Solutions

Answers vary. Sample responses:



a.

b. The top two are parallelograms. The bottom left one is a square. The bottom right one is a rectangle. (All of them are parallelograms.)

### Problem 5

From Grade 6, Unit 1, Lesson 6

a. A parallelogram has a base of 9 units and a corresponding height of  $\frac{2}{3}$  units. What is its area?

- b. A parallelogram has a base of 9 units and an area of 12 square units. What is the corresponding height for that base?
- c. A parallelogram has an area of 7 square units. If the height that corresponds to a base is  $\frac{1}{4}$  unit, what is the base?

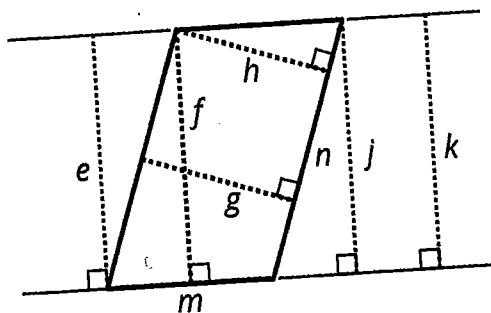
### Possible Solutions

- a.  $\frac{18}{3}$  square units (or equivalent)
- b.  $\frac{12}{9}$  units (or equivalent)
- c. 28 units

### Problem 6

From Grade 6, Unit 1, Lesson 5

Select **all** segments that could represent a corresponding height if the side  $n$  is the base.



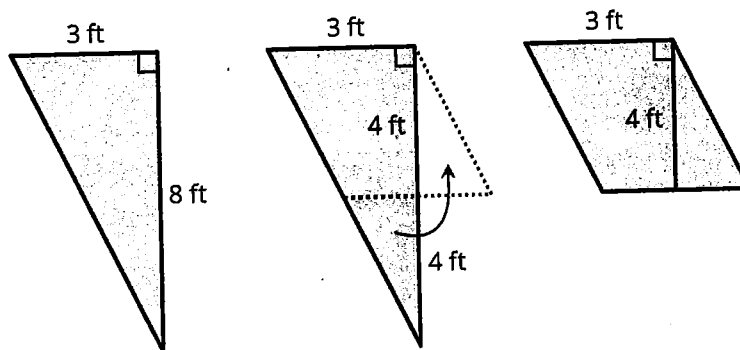
### Possible Solutions

$g, h$

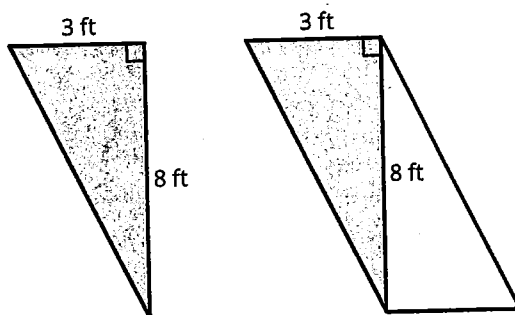
## Lesson 8 Practice Problems

### Problem 1

To find the area of this right triangle, Diego and Jada used different strategies. Diego drew a line through the midpoints of the two longer sides, which decomposes the triangle into a trapezoid and a smaller triangle. He then rearranged the two shapes into a parallelogram.



Jada made a copy of the triangle, rotated it, and lined it up against one side of the original triangle so that the two triangles make a parallelogram.



- a. Explain how Diego might use his parallelogram to find the area of the triangle.

- b. Explain how Jada might use her parallelogram to find the area of the triangle.

### Possible Solutions

Answers vary. Sample explanations:

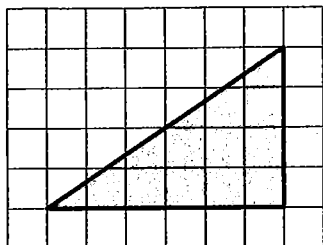
- a. Diego's parallelogram has a base of 3 feet and a height of 4 feet, so its area is 12 square feet. Because the original right triangle and the parallelogram are composed of the same parts, they have the same area. The area of the triangle is also 12 square feet.
- b. Jada's parallelogram has a base of 3 feet and a height of 8 feet, so its area is 24 square feet. Because it is composed of two copies of the right triangle, she could divide 24 by 2 to find the area of the triangle.  $24 \div 2 = 12$  or 12 square feet.

## Lesson 8 Practice Problems

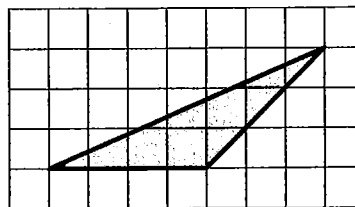
### Problem 2

Find the area of the triangle. Explain or show your reasoning.

a.

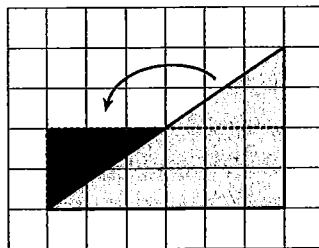


b.



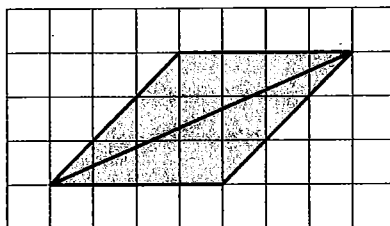
### Possible Solutions

- a. 12 square units. Reasoning varies. Sample reasoning: Make a horizontal cut, and rearrange the pieces to make a rectangle. The rectangle is 2 units by 6 units, so its area is 12 square units.

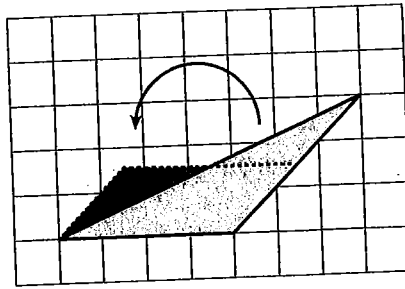


- b. 6 square units. Reasoning varies. Sample reasoning:

- Make a horizontal cut, and rearrange the pieces to make a parallelogram. The parallelogram has a base of 4 units and a height of  $1\frac{1}{2}$  units, so its area is 6 square units.

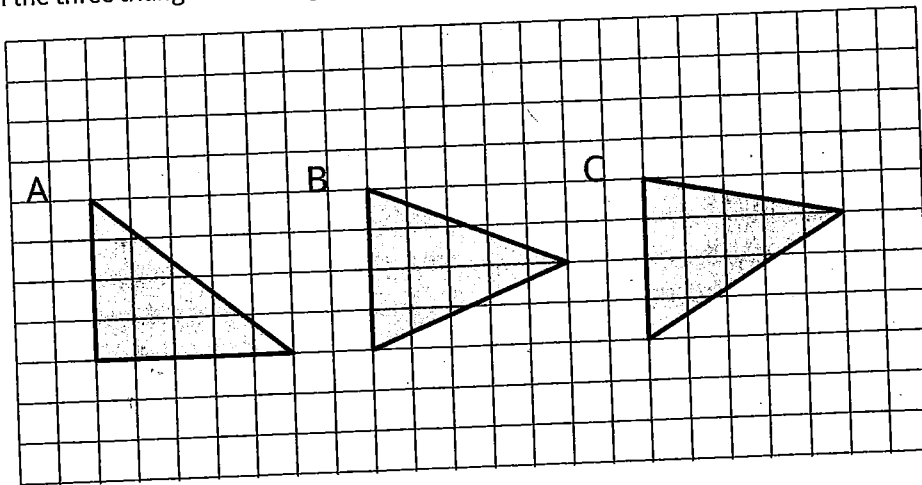


- Decompose the triangle with a cut line half-way between the base and the opposite vertex. Rearrange the smaller triangle to form a parallelogram. This parallelogram has a horizontal base of length 4 units and a height of 1.5 units, so its area is 6 square units. That means the area of the original triangle is 6 square units.



### Problem 3

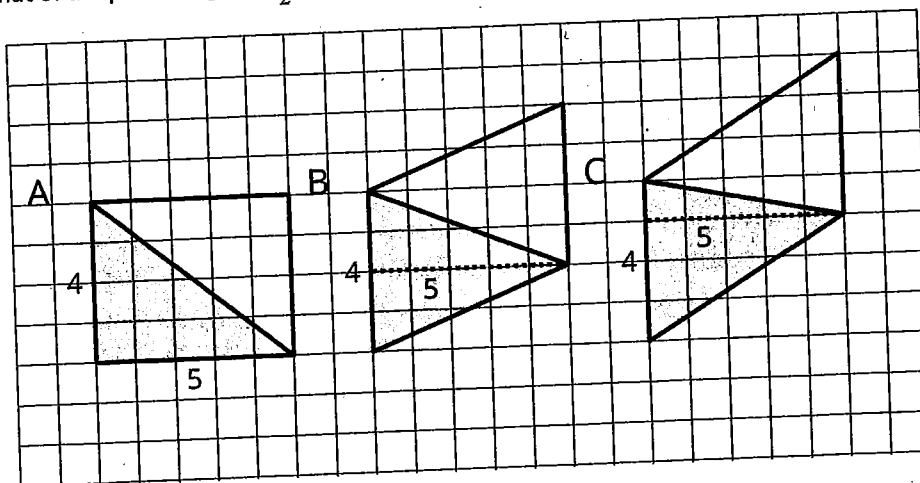
Which of the three triangles has the greatest area? Show your reasoning.



If you get stuck, use what you know about the area of parallelograms to help you.

### Possible Solutions

All three triangles have the same area of 10 square units. Reasoning varies. Sample reasoning: Two identical copies of each triangle can be composed into a parallelogram with a base of 5 units and a corresponding height of 4 units, which means an area of 20 square units. The area of each triangle is half of that of the parallelogram.  $\frac{1}{2} \cdot 20 = 10$ .

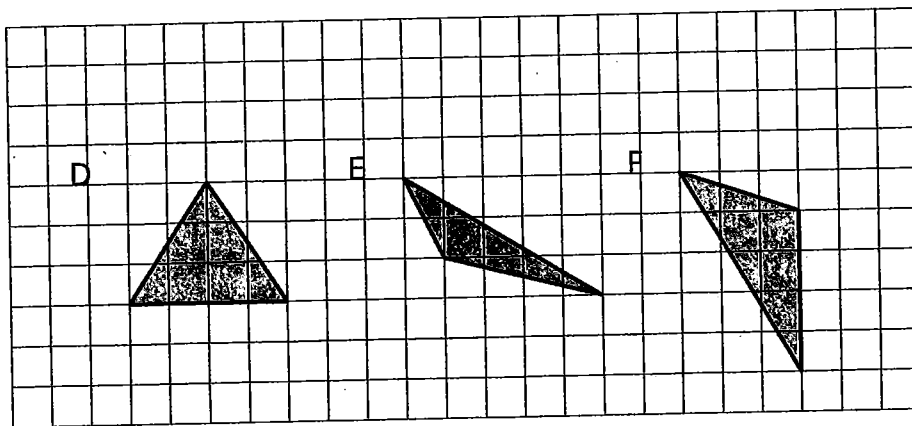


## Lesson 8 Practice Problems

### Problem 4

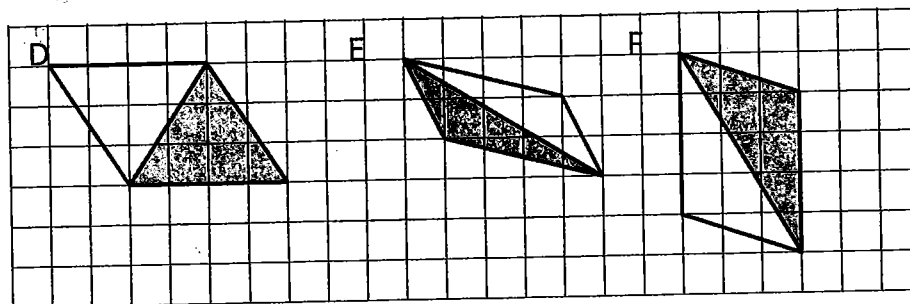
From Grade 6, Unit 1, Lesson 7

Draw an identical copy of each triangle such that the two copies together form a parallelogram. If you get stuck, consider using tracing paper.



### Possible Solutions

Answers vary. Sample response:



### Problem 5

From Grade 6, Unit 1, Lesson 6

- A parallelogram has a base of 3.5 units and a corresponding height of 2 units. What is its area?
- A parallelogram has a base of 3 units and an area of 1.8 square units. What is the corresponding height for that base?
- A parallelogram has an area of 20.4 square units. If the height that corresponds to a base is 4 units, what is the base?

### Possible Solutions

- 7 square units
- 0.6 units

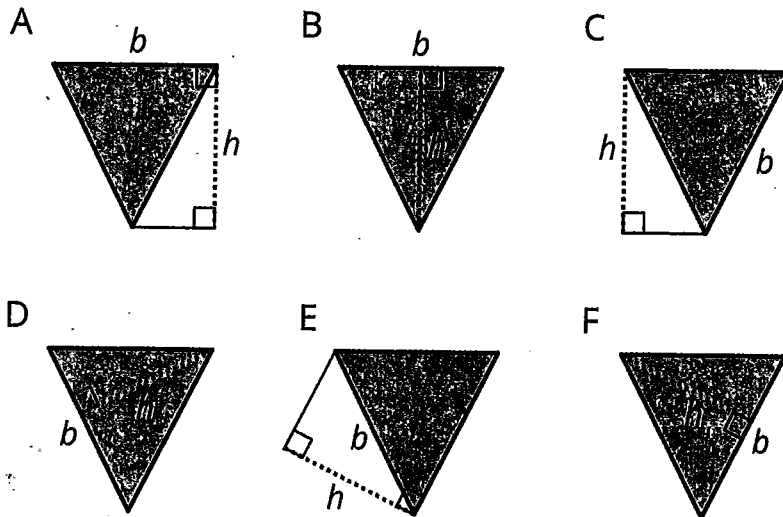


c. 5.1 units

# Lesson 9 Practice Problems

## Problem 1

Select **all** drawings in which a corresponding height  $h$  for a given base  $b$  is correctly identified.

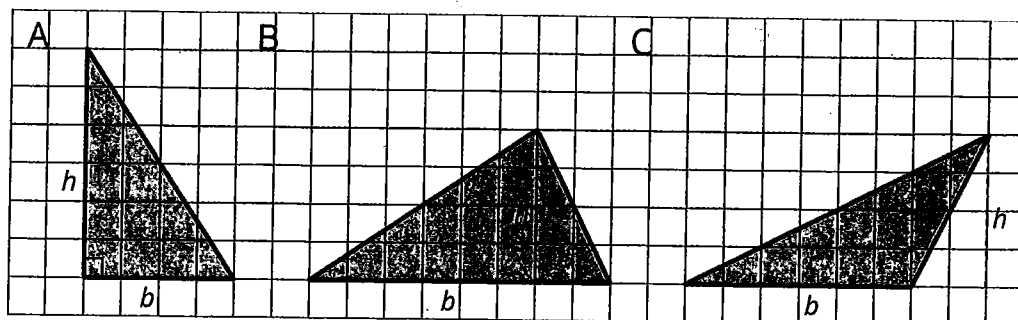


## Possible Solutions

A, B, D, F

## Problem 2

For each triangle, a base and its corresponding height are labeled.

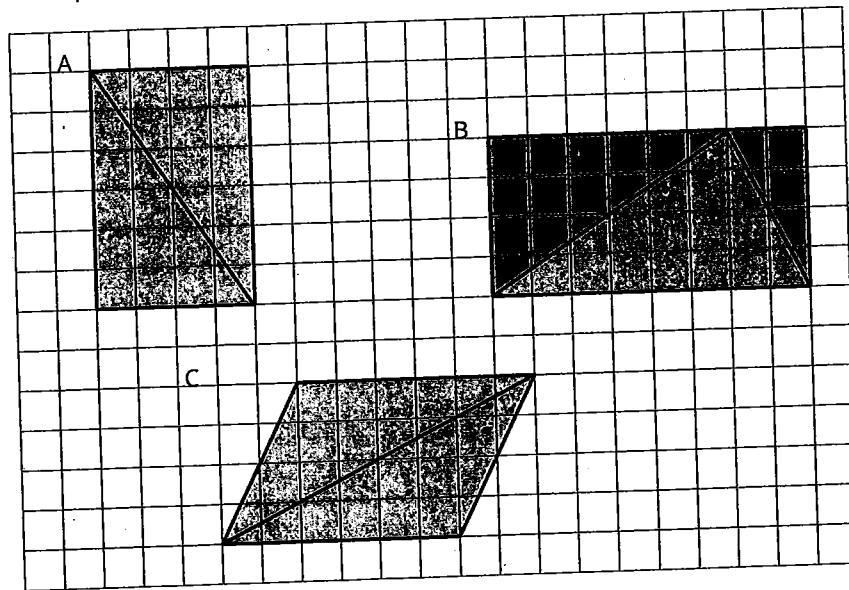


a. Find the area of each triangle.

b. How is the area related to the base and its corresponding height?

### Possible Solutions

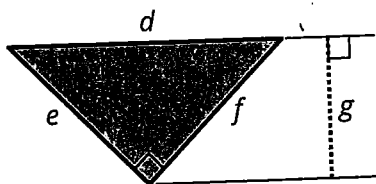
a. Triangle A: 12 square units, Triangle B: 16 square units, Triangle C: 12 square units



b. In each case, the area of the triangle, in square units, is half of the base times its corresponding height,  $\frac{b \cdot h}{2}$ .

### Problem 3

Here is a right triangle. Name a corresponding height for each base.



- a. Side  $d$
- b. Side  $e$
- c. Side  $f$

### Possible Solutions

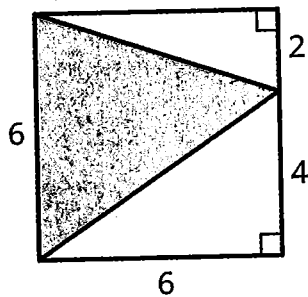
- a. Segment  $g$
- b. Side  $f$
- c. Side  $e$

### Problem 4

From Grade 6, Unit 1, Lesson 8

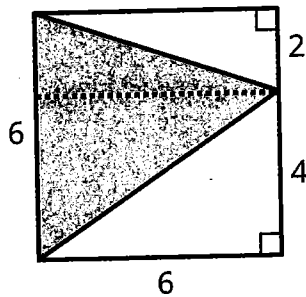
## Lesson 9 Practice Problems

Find the area of the shaded triangle. Show your reasoning.



### Possible Solutions

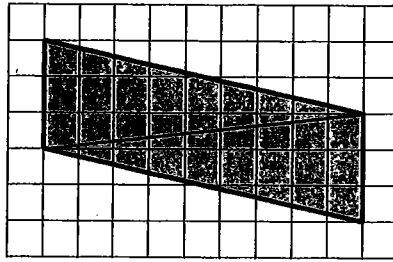
18 square units. Reasoning varies. One likely approach is to decompose the triangle with a horizontal line to form two rectangles and to split the triangle into two smaller triangles. The top triangle is half of the top rectangle, so its area is  $\frac{1}{2} \cdot 6 \cdot 2 = 6$ . The bottom triangle is half of the bottom rectangle, so its area is  $\frac{1}{2} \cdot 6 \cdot 4 = 12$ . The area of the original triangle is  $6 + 12$  or 18 square units.



### Problem 5

From Grade 6, Unit 1, Lesson 7

Andre drew a line connecting two opposite corners of a parallelogram. Select **all** true statements about the triangles created by the line Andre drew.



- A. Each triangle has two sides that are 3 units long.
- B. Each triangle has a side that is the same length as the diagonal line.
- C. Each triangle has one side that is 3 units long.
- D. When one triangle is placed on top of the other and their sides are aligned, we will see that one triangle is larger than the other.
- E. The two triangles have the same area as each other.

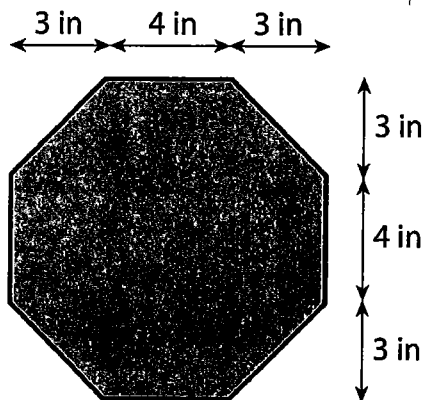
**Possible Solutions**

B, C, E

**Problem 6**

From Grade 6, Unit 1, Lesson 3

Here is an octagon.

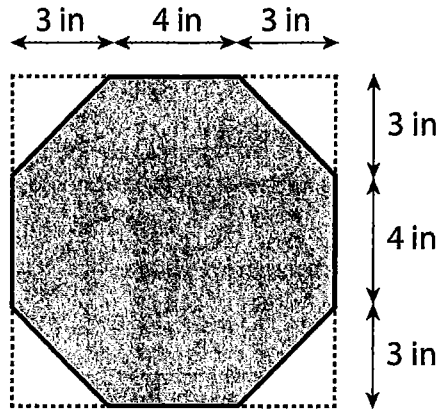


- a. While estimating the area of the octagon, Lin reasoned that it must be less than 100 square inches. Do you agree? Explain your reasoning.
- b. Find the exact area of the octagon. Show your reasoning.

## Lesson 9 Practice Problems

### Possible Solutions

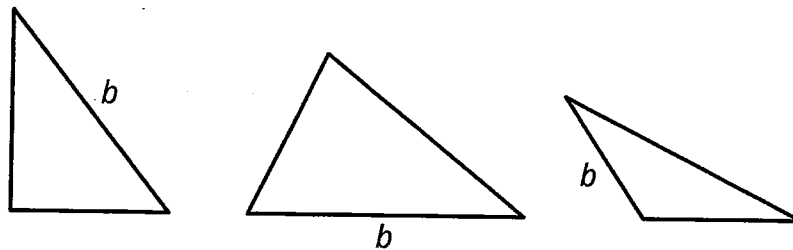
- a. Yes. Explanations vary. Sample explanation: The octagon fits in a square that is 10 inches by 10 inches, but with four corners of the square removed. The square has an area of 100 square inches, so the area of the octagon must be less than that.
- b. 82 square inches. Reasoning varies. Sample reasoning: A 10-inch-by-10-inch square that encloses the octagon has an area of 100 square inches. Two corner triangles compose a 3 inch-by-3 inch square, so their combined area is 9 square inches.  
 $100 - 2(3 \cdot 3) = 100 - 18 = 82$ .



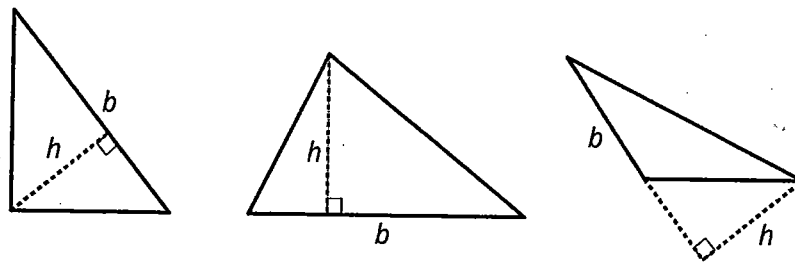
## Lesson 10 Practice Problems

### Problem 1

For each triangle, a base is labeled  $b$ . Draw a line segment that shows its corresponding height. Use an index card to help you draw a straight line.

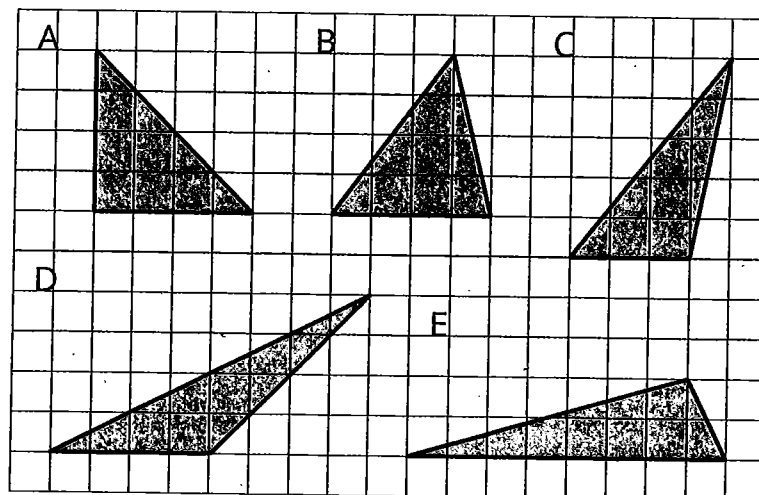


### Possible Solutions



### Problem 2

Select all triangles that have an area of 8 square units. Explain how you know.



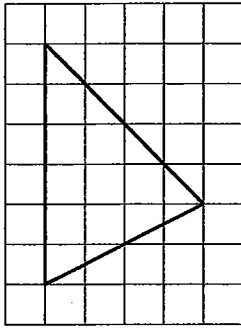
## Lesson 10 Practice Problems

### Possible Solutions

A, B, D, and E. Triangles A, B, and D all have a horizontal base of 4 units and a height of 4 units.  $\frac{4 \cdot 4}{2} = 8$ , so the area of each is 8 square units. Triangle C has a horizontal base of 4 units and a height of 5 units, so its area is 10 square units. Triangle E has a horizontal base of 8 units and a height of 2 units, so its area is 8 square units, since  $\frac{8 \cdot 2}{2} = 8$ .

### Problem 3

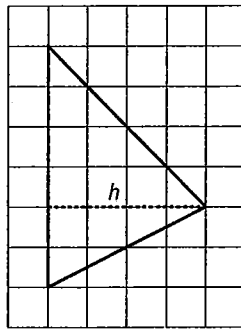
Find the area of the triangle. Show your reasoning.



If you get stuck, carefully consider which side of the triangle to use as the base.

### Possible Solutions

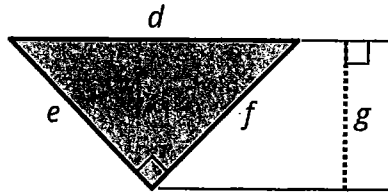
12 square units. Explanations vary. Sample response: The vertical side is 6 units long, and this side can be used as the base. The corresponding height, shown in the diagram, is 4 units. So the area is 12 square units. Another method is to surround the triangle with a rectangle then subtract the parts that are not in the triangle.





**Problem 4**

Can side  $d$  be the base for this triangle? If so, which length would be the corresponding height? If not, explain why not.



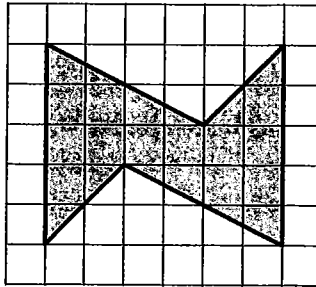
**Possible Solutions**

Yes, side  $d$  can be the base, because it is a side of the triangle. The corresponding height is  $g$ .

**Problem 5**

From Grade 6, Unit 1, Lesson 3

Find the area of this shape. Show your reasoning.



**Possible Solutions**

18 square units. Reasoning varies.

**Problem 6**

From Grade 6, Unit 1, Lesson 6

