Name _____ Date _____ Class _____

Additional Practice

Investigation 1

Frogs, Fleas, and Painted Cubes

1. The area A of a rectangle with a side of length ℓ meters and a fixed perimeter is given by the equation $A = \ell(240 - \ell)$.

a. Suppose one dimension of the rectangle is 180 meters. What is the other dimension? What is the area of the rectangle?

b. What are the dimensions of the rectangle with the greatest area possible for this perimeter? Explain how you found your answer.

c. What are the dimensions of the rectangle with this perimeter and an area of 8,000 square meters? Explain your answer.

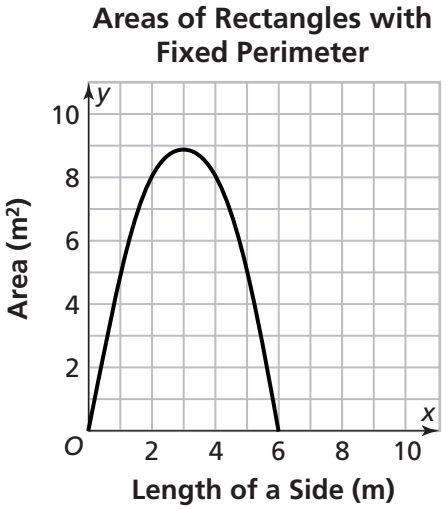
d. What is the fixed perimeter for the rectangles represented by this equation? Explain how you found the perimeter.

2. The graph shows length and area data for rectangles with a fixed perimeter.

a. What are the dimensions of the rectangle with this perimeter and an area of 8 square meters?

b. What are the dimensions of the rectangle with this perimeter and an area of 5 square meters?

c. What is the greatest area possible for a rectangle with this perimeter? What are the dimensions of this rectangle?



Additional Practice *(continued)*

3. Find the maximum area for a rectangle with a perimeter of 10 meters. Include the following in your answer and explain how each piece of evidence supports your answer.

- Sketch rectangles with a perimeter of 10 meters that do not have the maximum area and sketch the rectangle you think does have the maximum area.
- Make a table of the length of a side and the area for rectangles with a perimeter of 10 meters. Use increments of 1 meter for the lengths.
- Make a graph of the relationship between length and area of rectangles with a perimeter of 10 meters.

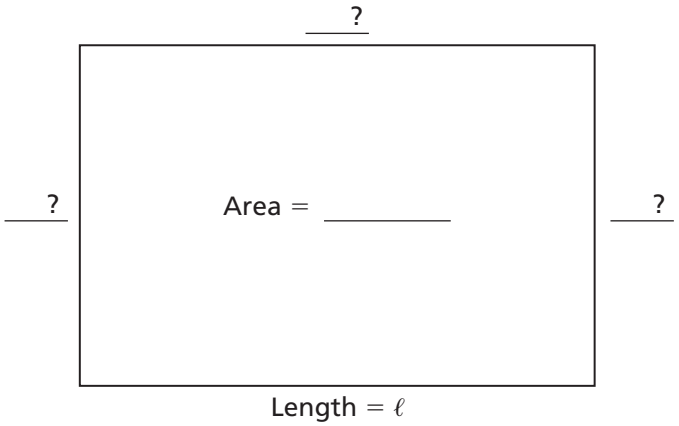
Additional Practice *(continued)*

4. Find the maximum area for a rectangle with a perimeter of 200 meters. Include the following in your answer and explain how each piece of evidence supports your answer:

- Sketch rectangles with a perimeter of 200 meters that do not have the maximum area and sketch the rectangle you think does have the maximum area.
- Make a table of the length of a side and the area for rectangles with a perimeter of 200 meters. Use increments of 10 meters for the lengths.
- Make a graph of the relationship between length and area of rectangles with a perimeter of 200 meters.

Additional Practice *(continued)*

5. The rectangle below has a perimeter of 60 meters and a side length ℓ meters.



a. Write an equation for the Area A in terms of ℓ. Make a graph of your equation.

b. Use your equation to find the area of the rectangle if the length of one side is 10 meters. How could you use your graph to find the answer?

c. Describe how you could use a table to find the area of the rectangle if the length of one side is 10 meters.

d. What is the maximum area possible for a rectangle with a perimeter of 60 meters? What are the dimensions of the rectangle with maximum area?

Additional Practice *(continued)*

6. a. Use your results to Exercises 3–5 above to describe the shape of a rectangle with maximum area.

b. What are the dimensions of a rectangle with maximum area if the perimeter is 100 meters?

c. What are the dimensions of a rectangle with maximum area if the perimeter is 10 meters?

d. What are the dimensions of a rectangle with maximum area if the perimeter is 1 meter?

e. What are the dimensions of a rectangle with maximum area if the perimeter is 0.1 meter?

Name _____ Date _____ Class _____

Additional Practice: Digital Assessments

Investigation 1

Frogs, Fleas, and Painted Cubes

7. A rectangle has a perimeter of 300 meters. Using the tiles, complete an equation to model the area, A, in terms of l, the length of the rectangle. You may use a tile more than once.

−	+	l	2
4	100	150	300

$A = (\square)(\square\ \square\ \square)$

8. The graph shows the length and area data for a rectangle with a fixed perimeter. Circle the numbers that make each statement true.

a. The fixed perimeter of the rectangle is

$\begin{bmatrix} 8 \\ 14 \\ 16 \\ 20 \end{bmatrix}$ meters.

b. If the area of the rectangle is 12 square meters,

then the dimensions are $\begin{bmatrix} 2 \text{ by } 6 \\ 3 \text{ by } 4 \\ 1 \text{ by } 12 \\ 5 \text{ by } 3 \end{bmatrix}$ meters.

c. The rectangle with the greatest possible area

has dimensions of $\begin{bmatrix} 3 \text{ by } 5 \\ 3 \text{ by } 3 \\ 4 \text{ by } 4 \\ 2 \text{ by } 6 \end{bmatrix}$ meters and an

area of $\begin{bmatrix} 8 \\ 12 \\ 16 \end{bmatrix}$ square meters.