

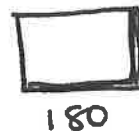
Additional Practice

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?



60m.

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

120 x 120

Thinking of the graph the x-axis would go up to 240. The line of symmetry goes halfway through it (at 120)

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

40 by 200

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

$$240 \times 2 = 480 \text{ m}$$

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?

2 and 4

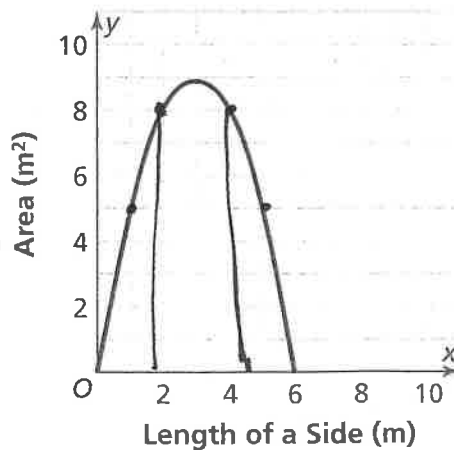
b. What are the dimensions of the rectangle with this perimeter and an area of 5 square meters?

1 and 5

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

9 m² 3 by 3

Areas of Rectangles with Fixed Perimeter



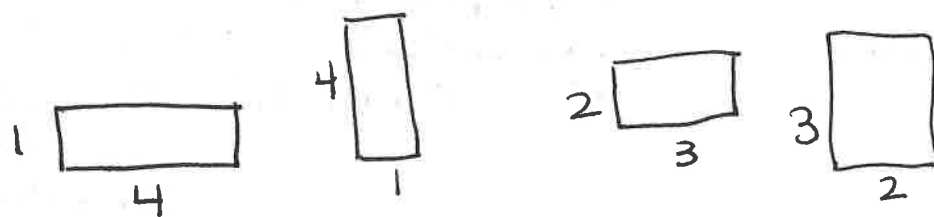
Additional Practice *(continued)*

Investigation 1

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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.

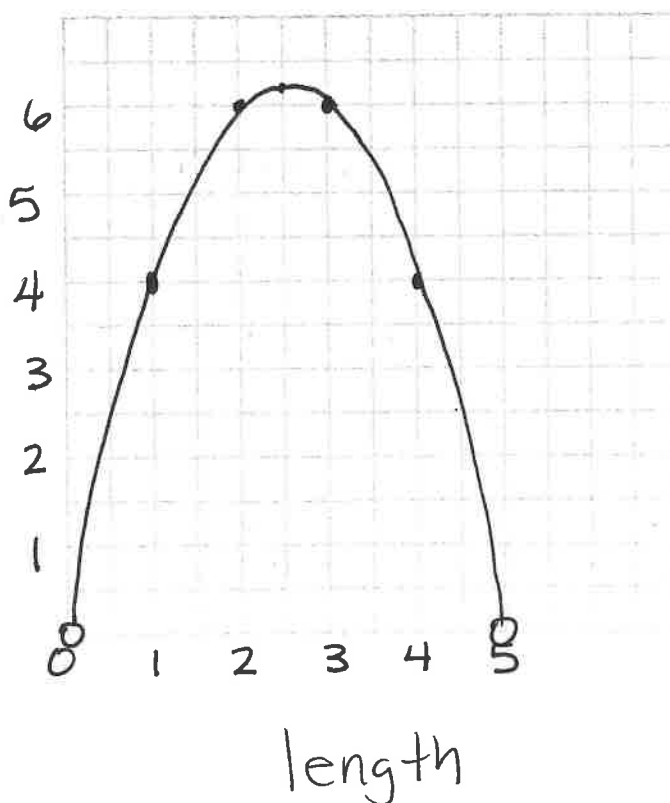
- Sketch rectangles with a perimeter of 10 meters that do not have the maximum area and sketch the rectangle you think does have the maximum area.
- Make a table of the length of a side and the area for rectangles with a perimeter of 10 meters. Use increments of 1 meter for the lengths.
- Make a graph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



l	a
1	4
2	6
3	6
4	4

Area

Area w/ Fixed perimeter



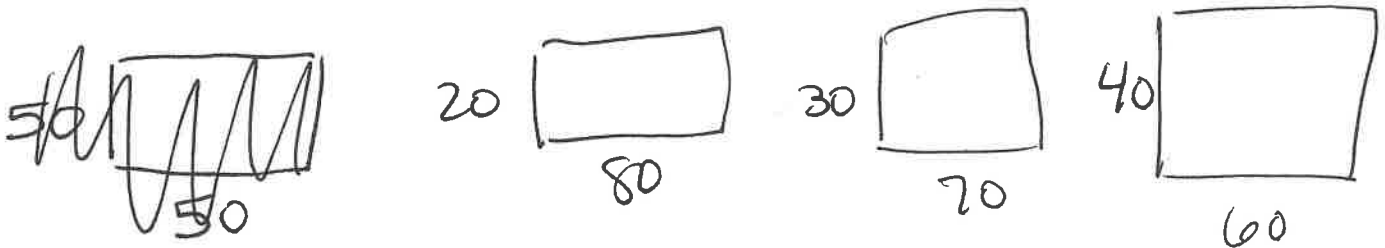
Additional Practice *(continued)*

Investigation 1

Frogs, Fleas, and Painted Cubes

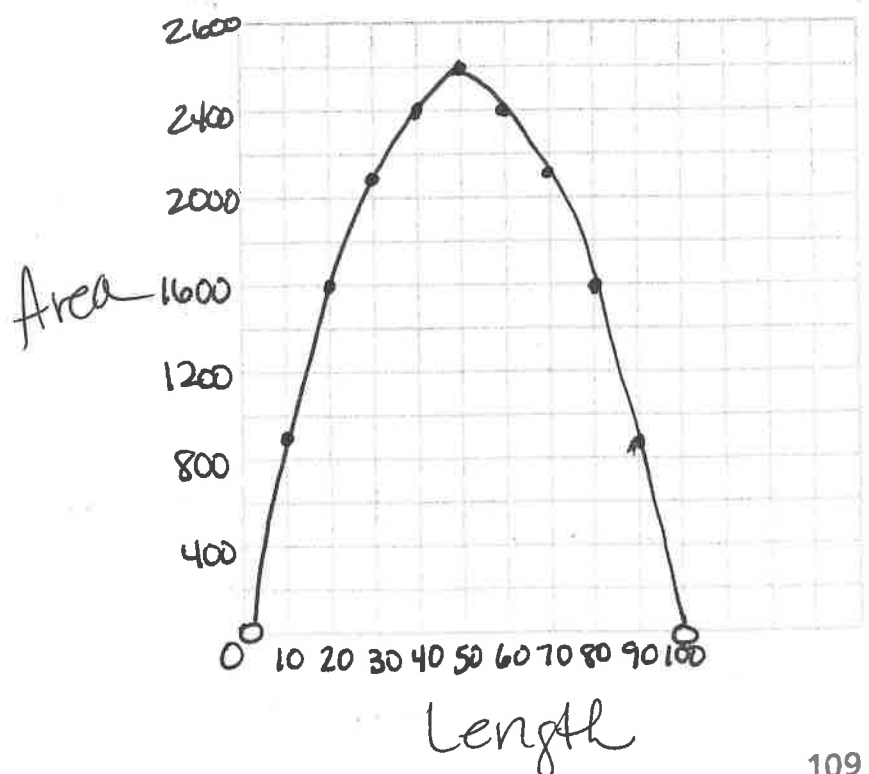
4. Find the maximum area for a rectangle with a perimeter of 200 meters. Include the following in your answer and explain how each piece of evidence supports your answer:

- 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.



l	A
5	475
10	900
15	1275
20	1600
25	1875
30	2100
35	2275
40	2400
45	2475
50	2500
55	2475
60	2400
65	2275

Area w Fixed Perimeter

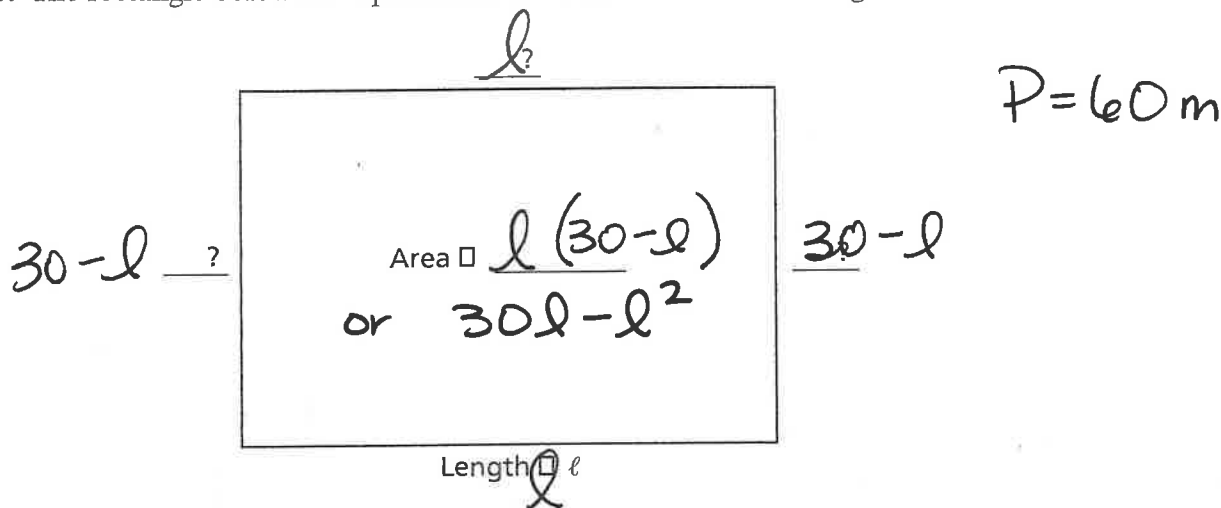


Additional Practice (continued)

Investigation 1

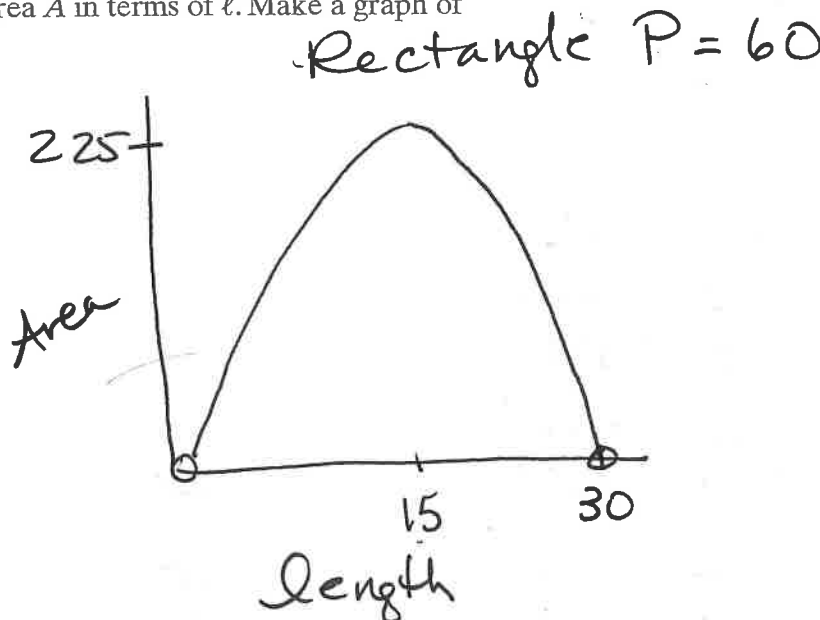
Frogs, Fleas, and Painted Cubes

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.

$A = \ell(30 - \ell)$
 or
 $30\ell - \ell^2$



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?

$200m^2$

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

Look for 10 in length column to find Area

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?

$225m^2$