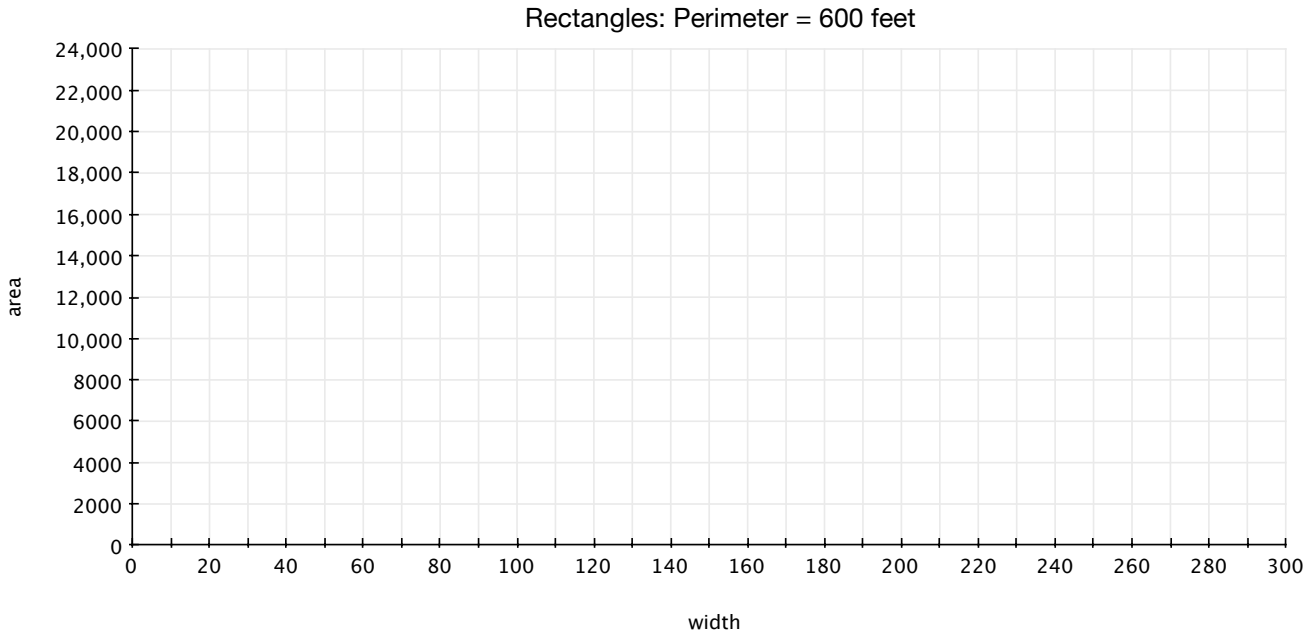
Fixed Perimeter, Changing Area

Use What You've Learned

1. Mia purchased an underground dog fence that includes 500 feet of wire. Mia also bought an additional 100 feet of wire. She wants to fence in a rectangular region using all of the wire.
   a. What dimensions could Mia use to construct her fence? What is the area of each region? There are many possible solutions to this problem. List at least six solutions in the table below.

Rectangles: Perimeter = 600 feet		
Width	Length	Area

   b. Use the grid below to graph the widths and areas of rectangles that have a perimeter of 600 feet. Make the x-axis equal to the width of the rectangle and the y-axis equal to the area of the rectangle.



   c. Describe what the graph would look like if you included all possible rectangles with a perimeter of 600 feet.

   d. What are the dimensions of the rectangle with the maximum area? What is the area?

2. Carlos purchased an underground dog fence that includes 500 feet of wire. Carlos also bought an additional 150 feet of wire. He wants to fence in a rectangular region with the maximum area possible using all of the wire.
   a. What dimensions should Carlos use to construct his fence? What is the area of the enclosed region?

   b. How do you know that your answer gives the maximum area for a rectangular region?

3. Consider a set of rectangles that have the same perimeter but different areas. Describe the shape of rectangles with a smaller area versus those with a larger area.

4. What is the smallest possible area for a rectangular yard that has a perimeter of 650 feet?