

1.A Graphing Rectangle Areas

How does the area of a rectangle change if you vary either the length or the width and leave the other dimension unchanged? How does the area of a rectangle change if you vary both the length and the width? Tables and graphs will help you investigate these questions and notice patterns.

- What is the area of a rectangle having the following dimensions?
 - 1 by 9
 - 2 by 9
 - 3 by 9
 - 9 by 9
- What is the area of a rectangle having the following dimensions, if $x = 10$?
 - 1 by x
 - 2 by x
 - 3 by x
 - x by x
- Make a table like this, extending it to $x = 6$.

Area of rectangle having dimensions:				
x	1 by x	2 by x	3 by x	x by x
1	1	2	3	1
2

- Draw axes, with x on the horizontal axis, and area on the vertical axis. Plot the points you obtained in problem 3 for the area of 1-by- x rectangles. For example, (1, 1) will be on the graph.
- Does it make sense to connect the points you plotted? What would be the meaning of points on the line, in between the ones you got from your table? Label your graph 1 by x .

- On the same axes, graph the data you obtained for 2-by- x , 3-by- x , and x -by- x rectangles. For more accuracy on the last one, you may use your calculator to find points for $x = 0.5, 1.5$, and so on. Label your graphs 2 by x , 3 by x ...

- Report** Write about the four graphs. Describe them and compare them. Your report should reflect what you learned in the above investigation. It should consist of three parts: a problem statement, a detailed explanation, and a conclusion. It should include, but not be limited to, answers to the following questions.
 - What is the shape of each graph?
 - Which ones are alike? Different? Why?
 - How do the first three graphs differ from each other? What is the meaning of that difference?
 - What is special about the fourth? Why?
 - Do the graphs ever intersect each other? What is the meaning of the points of intersection?
 - Where do they cross the vertical axis, and what is the meaning of that point?
 - Where does the fourth one cross the others, and what are the meanings of those points?
 - Which area grows the fastest? Why?