Maximizing Space for Ziggy NAME:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

A1.QE.5/ A11.Q.1

You have 200 feet of fencing available and need to build a rectangular pen. Your goal is to find the dimensions that would give the family dog, Ziggy, the maximum living area. Suppose you decide to build a rectangular pen along the back of the house so that you only need to fence in three sides (i.e., the house is the fourth side and would not need fencing)

1. Draw a sketch of the rectangular pen in its location against the back of the house. Label the side opposite

the house as y and the two sides connecting the y-side to the house as x.

2. Construct a table that gives the width, length, and area of different rectangular pens. Observe how

different dimensions change the value of the area of the pen.

|  |  |  |
| --- | --- | --- |
| Width, x  (feet) | Length, y  (feet) | Area, A  (sq. feet) |
| 10 |  |  |
| 20 |  |  |
| 30 |  |  |
| 40 |  |  |
| 50 |  |  |
| 60 |  |  |
| 70 |  |  |
| 80 |  |  |
| 90 |  |  |

3. Using the information from your chart, sketch a graph. Be sure to label the axes.

4. a.) Write an equation for the fencing needed using only variables x and y and the 200 feet of fencing that

will enclose the three sides of the pen.

b.) The equation in part a involves two related variables x and y. Isolate y in the equation from part a. Your

equation for y should be written in terms of x.

c.) Write an equation for the area in terms of the length and width of the pen. Substitute the expression

you obtained for y from part b into the given area formula so that A is written only in terms of the

variable x.

5. Based on the information from this activity, find the maximum area for Ziggy and state the dimensions that

will produce the maximum area. Be sure to include units with your answers.