Maximizing the Area of a Garden:

Question Sheet

Story: A barn owner has asked you to help him maximize his profit by helping him build a rectangular garden. The barn owner has 62 feet of fencing to work with; however, one side of the garden will be against his barn and requires no fence. Your job is to find the dimensions of the garden that will maximize its area. The more area the barn owner has to garden, the more money he will earn (and the more money you will make! … so make sure you find the maximum area!!) 😊

1. Below are 4 sketches of rectangular gardens. Using at most 62 feet of fencing, record the width, length and area of 4 possible gardens.

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<thead>
<tr>
<th>area =</th>
<th>width =</th>
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<tbody>
<tr>
<td>length =</td>
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2. Based on the four possible gardens above, make a prediction on the values of the length, width and area which will maximize the area of the barn owner’s garden.

Length: ________________  Width: ________________  Area: ________________
3. There is 62 feet of fencing available, please write an expression for the length of one side of our garden in terms of width.

_________________________________________________________________________________

4. What do points D and E represent?

_________________________________________________________________________________

5. After moving point B on your screen, does your answer to number 4 change? If yes, how?

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_________________________________________________________________________________

6. What does the expression CE·EF represent?

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_________________________________________________________________________________

7. As you move point B, what is it doing to the length/width/area of the garden?

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8. Predict the shape of the graph created by moving point B (the changing areas of the garden). Explain your reasoning.

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9. Was your prediction in number 8 correct? Does the actual shape of the graph surprise you? Why or why not?

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10. What do you notice about the values in column B and column C? Why do you think this is the case?

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11. What does the ‘M’ represent on the graph? How does this coordinate point (‘M’) relate to the barn owner and garden problem?

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12. What are the actual dimensions you would recommend (length/width/area) that will maximize the area of the barn owner’s garden? How close were these values to your predictions in question 2?

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