The Farmer's Fence (Chapter 9 Project Option 2e)

Algebra 1

In this investigation you will explore the area measurement of a rectangle when the perimeter is *fixed* (the perimeter stays the same).

1. Download the file FixedPerimeter.gsp from the class website.
2. Open the file with The Geometer's Sketchpad.
3. Read the two situations on the first page. Choose one, and click its button.
4. Both situations show a rectangle with an arrow that says "drag here."
   (a) Notice that he area of the rectangle has been measured, as well as the length of one side, which is labeled *x*.
   (b) Another measurement indicates the length of fence being used (20 cm).
   (c) Drag the arrow and watch what happens. Observe the rectangle and also the measurements.
5. Now you are ready to explore the answer to the problem.
   (a) Drag the arrow and estimate when you have the maximum possible area. Write down that area here: _____
6. Make a table of side lengths and areas.
   (a) Click in white space to unselect everything; then click on the measurement of *x* and the area measurement *in that order*.
   (b) Choose Graph | Tabulate. This will make a table of *x* vs. the area.
   (c) Adjust the rectangle, and you will see the table automatically update.
   (d) Double click the table. This "locks in" one row of the table. A new row appears.
   (e) Adjust the rectangle and lock in another row of the table. Do this until you have at least ten rows. Try to get a large range of values in your table.
7. Now you will graph the values in the table.
   (a) Click the button that says Show Coordinate Grid.
   (b) Choose Graph | Plot Table Data. Click OK on the graph that pops up. This will make a scatter plot of the table data.
   (c) What shape do the points form? _____
8. Draw the whole parabola.
   (a) Again click in white space and then select *x* followed by the area.
   (b) Choose Graph | Plot as (x,y). This will plot a new point that will automatically move as you adjust the rectangle. Right click this new point and select Trace Plotted Point.
   (c) Adjust the rectangle again and watch what happens.
9. Use algebra to write an equation for the parabola you have just plotted.
10. Repeat steps 1-9 for the other situation. Show answers and work on another paper.
11. Complete the investigation, "Making the Most of It" on pp. 502-503.

Turn in these things:

1. This handout, with all answers completed.
2. Answers to the investigation from p. 502, neatly recorded.
3. A paragraph describing what you learned from this activity. Be specific.