Maximizing the Area of a Fenced in Region – Class Handout

Suppose that you need to enclose a rectangular area with a fence along the side of a building. Since the area you create will be along the side of a building, you only need a fence on each of three sides. Your job is to model this situation with a bendable stick.

1. Assume that the bendable stick provided to you is a small scale model of your fencing material. Sketch a diagram of the region in question and label the sides as length and width, with length being the side opposite the building. Use your bendable stick to generate a variety of possible fence configurations. For each fencing possibility, measure the length and width and enter the data in the table below.

   Bendable stick is _____ cm long.

Length	Width	Area

2. Look at your table and estimate what you believe the maximum area is.
3. Your class will be collecting data from everyone's fences. Record your data along with your classmates, and look at the collection of data.
   (a) Which class measurements seem to create the maximum area?
   (b) Are there any constraints to the problem? That is, are there any limitations on how much fencing you can use or what shape the enclosed region must be?
   (c) Are there any data points on the class list that do not coincide with the constraints of the problem? How can you tell?
4. If there is a constraint, write an equation that describes the constraint.
5. Write an equation for the area in terms of one variable.
6. Use calculus to determine the dimensions of the fenced in region of maximal area.
7. How does your answer from calculus compare to the data generated at the beginning of class?