Chapter 4:5: Optimization and Modeling

Calculus I

College of the Atlantic. Fall 2014

1. You recently acquired three alpacas and need to fence in a pasture so they don't wander off. Fortunately, you have a tall stone wall along one side of your property. So you'll need to build three walls, not four, to produce a nice rectangular field. You can afford 100 meters of fencing material. What dimensions should your field be so as to maximize the area available to the alpacas?

2. You need to make a cylindrical can that has a volume of 1000. What dimensions for the can will use the smallest amount of material?

3. The strength of a rectangular beam of width w and height h is proportional to hw^2. A beam is to be cut from a log of radius r. What beam dimensions maximize the strength of this beam?

4. What point along the curve $y = \sqrt{x}$ is closest to the point $(4, 0)$?