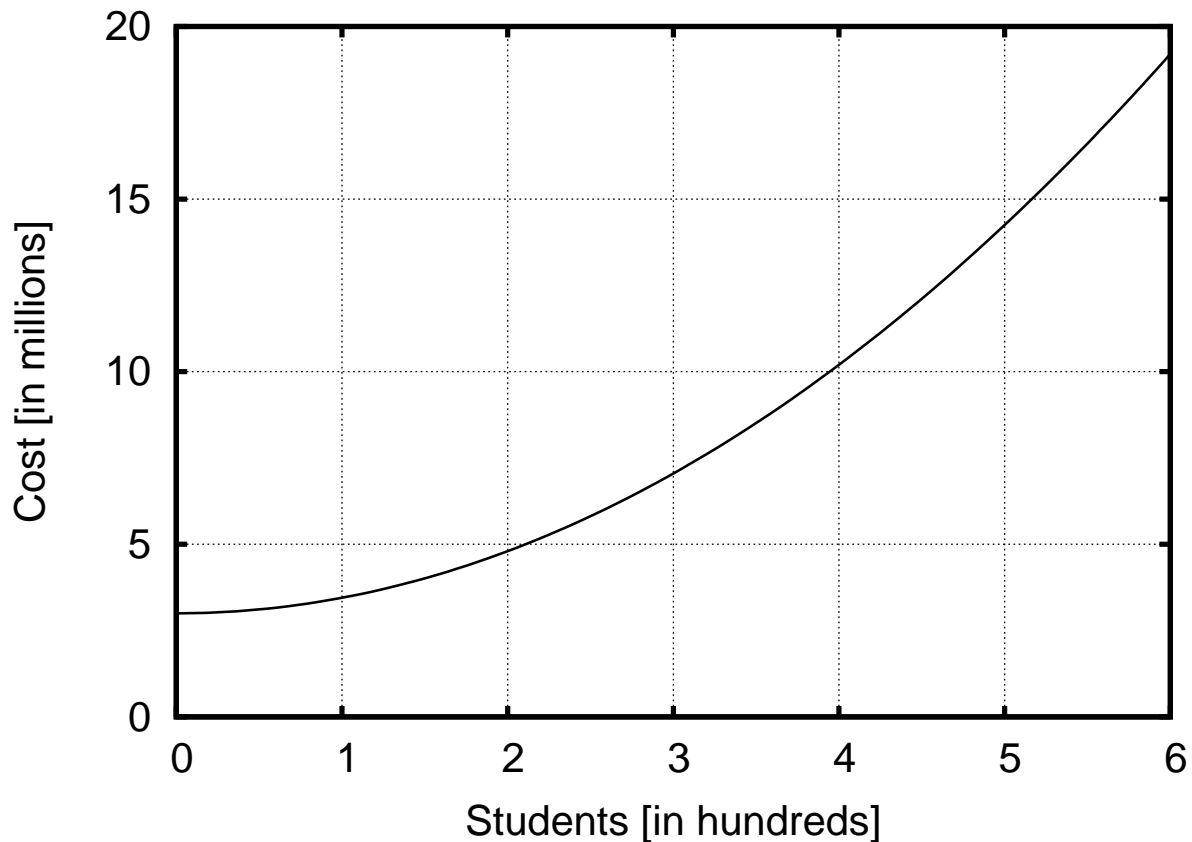


Chapter 4:4: Optimization and Modeling

Calculus I

College of the Atlantic. Halloween, 2022

1. In the figure is shown a plot of the cost of running a school as a function of the number of students.
 - (a) What is the average cost per student if the enrollment is 100?
 - (b) What is the average cost per student if the enrollment is 500?
 - (c) What number of students leads to the lowest average cost per student?



2. 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?

3. You have a piece of wire of length L . You wish to use this wire to make a rectangle. What dimensions for the rectangle will maximize the area?

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

5. You have a piece of wire of length L . You will cut this wire into two pieces. You will use one of the pieces of wire to make a circle and the other piece of wire to make a square. How should you cut the wire so that the resulting area of the two shapes is maximized?