AP Calculus
3.7 – Optimization

1. Farmer Joe has 100ft of fence with which he wants to build a rectangular grazing area for his goats. What dimensions will produce the maximum area?

2. Find two positive real numbers such that their product is 192 and sum is a minimum.

3. Farmer Joe is back and needs help! The goats have formed two gangs and are out to kill each other. Farmer Joe's solution is to build a new rectangular area that is divided into two equal parts separated by a fence. If he now has 200m of fence, determine the maximum area of each of the two sections.

4. Design a cylindrical can of volume 10 ft^3 so that it uses the least amount of material.

5. An open-top box is to be made by cutting out congruent squares from the corners of a 20 by 25 cm sheet of metal and bending up the sides. How large should the squares be to maximize the volume of the box? What is the resulting volume?

6. A rectangle is to be inscribed under the arch of the cosine curve that straddles the *y*-axis, i.e. $-\frac{\pi}{2} \le x \le \frac{\pi}{2}$. Determine the dimensions of the rectangle that will have the largest area.

Assignment: 3.7, p.265: #1, 3, 5, 7, 9, 11, 24, 39.