RECITATION 11: 4-7 OPTIMIZATION (PART 2)

STARTER PROBLEM: Write out the steps (hoops) you will need get through in order to produce a complete and correct answer to an optimization problem.

PRACTICE PROBLEMS:

1. Find the area of the largest rectangle that can be inscribed in a semicircle of radius 10.

2. A retailer has been selling 1200 tablet computers a week for $350 each. The marketing department estimates that an additional 80 tablets will sell each week for every $ 10 that the price is lowered.

(a) Find the demand function.

(b) What should the price be set at in order to maximize revenue?

(c) If the retailer's weekly cost function is $C(x) = 35,000 + 120x$ where x is the number of tablets what price should it choose in order to maximize its profit.

3. An oil refinery is located on the north bank of a straight river that is 2 km wide. A pipeline is to be constructed from the refinery to storage tanks located on the south bank of the river 10 km downstream of the refinery. The cost of laying pipe is $ 10,000/ km over land to a point P on the opposite bank and then $ 40,000/km under the river to the tanks. To minimize the cost of pipeline, where should P be located?

4. Two posts, on 12 feet high and the other 28 feet high stand 30 feet apart. They are to be stayed by two wires, attached to a single stake, running from ground level to the top of each post. Where should the stake be placed to use the least amount of wire?

5. Four feet of wire is used to form a square and a circle. How much of the wire should be used for the square and how much should be used for the circle to enclose the maximum area?