HW 19: Section 3.7

Due: Thursday, November 14th in SQRC by 9pm

Learning Goals:

- Read and interpret word problems into mathematical information.
- Find critical points and local maximums and minimums of functions.
- Solve word problem optimization problems.

Questions:

1. Problem 3.7.2 A three-sided fence is to be built next to a straight section of river, which forms the forth side of a rectangular region. There is 96 feet of fencing available. Find the maximum enclosed area and the dimensions of the corresponding enclosure.

2. Problem 3.7.8 A box with no top is built by taking a 12cm by 16cm sheet of cardboard, cutting x-cm squares out of each corner and folding up the sides. Find the value of x that maximizes the volume of the box.

3. Problem 3.7.6 Show that a rectangle of minimum perimeter for a given area A is always a square.

4. Problem 3.7.20 A company needs to run an oil pipeline from an oil rig 25 miles out to sea to a storage tank that is 5 miles inland. The shoreline runs east-west and the tank is 8 miles east of the rig. Assume it costs \$50 thousand per mile to construct the pipeline under water and \$20 thousand per mile to construct the pipeline on land. The pipeline will be built in a straight line from the rig to a selected point on the shoreline, then in a straight line to the storage tank. What point on the shoreline should be selected to minimize the total cost of the pipeline? (hint: use a computer to help you with this one).