For Section 3.5 Word Problems

1. The price charged for a candy bar is \( p(x) \) cents, the \( x \) thousand candy bars will be sold in a certain city, where \( p(x) = 160 - \frac{x}{10} \).
   a. Find an expression for the total revenue from the sale of \( x \) thousand candy bars.
   b. Find the value of \( x \) that leads to maximum revenue.
   c. Find the maximum revenue.

2. A television manufacturing firm needs to design an open topped box with a square base. The box must hold 32 cubic inches. Find the dimensions of the box that can be built with the minimum amount of material.

3. Find the dimensions and volume of the right circular cylinder of maximum volume inscribed in a sphere with radius 70 cm.

4. A company wishes to run a utility cable from point \( A \) on the shore to an installation at point \( B \) on the island. The island is 6 miles from the shore. It costs $400 per mile to run the cable on land and $500 per mile underwater. Assume that the cable starts at \( A \) and runs along the shoreline, then angles and runs underwater to the island. Find the point at which the line should begin to angle in order to yield the minimum total cost.
5. A local club is arranging a charter flight to Hawaii. The cost of the trip is $596 each for 80 passengers, with a refund of $5 per passenger for each passenger in excess of 80.
   a. Find the number of passengers that will maximize the revenue received from the flight.
   b. Find the maximum revenue.

6. A fence must be built to enclose a rectangular area of 20000 square feet. Fencing material costs $1 per foot for the two sides facing north and south and $2 per foot for the other two sides. Find the cost of the least expensive fence.