

Date: _____

3.4 Optimization Problems in Economics and Science



The process for solving optimization problems applied to economics and science is the same as the one that we applied with problems that applied to measurement in 3.3. As long as you know the subject specific vocabulary, you will be able to set up and solve a system of equations to find optimal values.

A Familiar Example:

A bus company has 4000 passengers daily, each paying a fare of \$2. For each \$0.15 increase in fare, the company estimates that it will lose 40 passengers per day. The company needs to make at least \$10450 per day. What fare should be charged to maximize their revenue?

Use Previous Knowledge:

Use Calculus:



2) Maximizing Profit

Through market research, a computer manufacturer found that x thousand units of its new laptop will sell at a price of $2000 - 5x$ dollars per unit. The cost, C , in dollars to produce this many units is $C(x) = 15\,000\,000 + 1\,800\,000x + 75x^2$. Determine the level of sales that will maximize profits.



Business Vocabulary

Recall that **revenue** is **price times quantity**, and **profit** is **revenue minus cost**. **Cost** can be calculated by multiplying the cost per item with the number of items sold. **Marginal Cost** is the rate of change of cost per item sold ($C'(x)$).