

## Profit Problems (Calculus for Business and Commerce)



1. WhistlerBlackcomb is investigating how many thousands of season's passes they need to sell next season to maximize profit. They determine that the revenue they generate depends on the #of season passes sold in the following way:

$$R(x) = 2x^3 + 40x^2 + 8x ;$$

where R is **revenue** and  $x$  is the number of season's passes sold (**in thousands**).

They also determine the cost of running the mountain can be described by the following function:

$$C(x) = 3x^3 + 19x^2 + 80x - 800 ;$$

Where C is **cost** and  $x$  is the number of season's passes sold (**in thousands**).

**Determine how many thousands of season's passes they should sell to maximize profit.**

(answer: 12 thousand)

A manufacturer of men's shirts determines that her costs will be 500 dollars for overhead plus 9 dollars for each shirt made. Her accountant has estimated that the *selling price*  $s$  (of each shirt) should be determined by:

$$s = 30 - 0.2\sqrt{x} \quad \text{where } x \text{ is the number of shirts sold.}$$

- a) How many shirts should be produced to maximize profit? 4900
- b) At what price will the shirts be sold? \$16
- c) What is her resulting profit? \$33800



Problem 1. The regular air fare between Boston and San Francisco is \$500. An airline using planes with a capacity of 300 passengers on this route observes that they fly with an average of 180 passengers. Market research tells the airlines' managers that each \$ 5 fare reduction would attract, on average, 3 more passengers for each flight. How should they set the fare to maximize their revenue? Explain your reasoning to receive credit.

Problem 3. A Florida Citrus grower estimates that if 60 orange trees are planted; the average yield per tree will be 400 oranges. The average yield will decrease by 4 oranges per tree for each additional tree planted on the same acreage. How many trees should the grower plant to maximize the total yield?

Problem 2. A baseball team plays in a stadium that hold 55,000 spectators. With ticket prices at \$10, the average attendance had been 27,000. A market survey showed that for each \$0.10 decrease in the ticket prices, on the average, the attendance will increase by 300. How should ticket prices be set to maximize revenue?

Answer: best ticket price \$9.50