Some Calculus Problems in Business
With Answers

1. The cost in dollars to produce x tons of a certain product is $C(x) = 525 + 400x - 54x^2 + x^4$.

   a) What level of production minimizes the marginal cost?

   3 tons.

   b) What level of production minimizes the average cost?

   5 tons

2. A store has been selling skateboards at a price of \$40 per board and at this price skaters have been buying 45 boards a month. The owner of the store wishes to raise the price and estimates that for \$1 increase in the price, 3 fewer boards will be sold each month. If each board costs the store \$29, at which price should the store sell the boards to maximize profits?

   \$42

3. Farmers can get \$2 per bushel for the potatoes on July 1, and after that the price drops 2 cents per bushel per day. On July 1 a farmer has 80 bushels of potatoes in the field and estimates that the crop is increasing at a rate of 1 bushel per day. When should the farmer harvest the potatoes to maximize revenue?

   On July 11

4. You make and sell x pizzas. In dollars, your income is $R(x) = 10x - 0.03x^2$ and your cost is $C(x) = 3 + 4x + 0.1x^2$.

   a) Describe the following as functions of x: The profit, the average profit per pizza, and the marginal profit per pizza.

   The profit is $-3 + 6x - 0.13x^2$.

   The average profit is $\frac{-3}{x} + 6 - 0.13x$.

   The marginal profit is $6 - 0.26x$.

   b) What is the demand function for your business? If the price of a pizza is p, how many pizzas should you expect to sell?

   The demand function is $p = 10 - 0.03x$.

   At a price p, you should expect to sell $\dot{x} = \frac{1000-100p}{3}$ pizzas.

   c) How many pizzas should you make to maximize your profits? What will the price of a pizza be?

   You should make and sell 23 pizzas at a price of \$9.31.