Name: ANSWER KEY **Math 1030 Quiz #4A** (June 16th, 2010)

1. Bob's store sells a lot of ice cream bars. In fact, Bob plans on selling 15000 bars this year. Suppose that Bob pays \$2 per bar and \$60 to get a shipment delivered. Bob has also estimated that his inventory costs are \$0.85 per bar per year (base inventory costs on the average with all the standard assumptions). If $C(x)$ is Bob's ice cream bar cost function...

   $$C(x) = 2(15000) + 0.85\left(\frac{x}{2}\right) + 60\left(\frac{15000}{x}\right)$$

   We punch in "`derivative of 2(15000)+0.85(x/2)+60(15000/x)`" into Wolfram Alpha and scroll down. Alpha found that the derivative has roots ± 1455.21. Throwing out the negative number we get that our ideal economic order quantity is $x = 1455.21$. To find the minimal cost, we need to plug our EOQ into $C(x)$. So we enter "`2(15000)+0.85(x/2)+60(15000/x) at x=1455.21`" into Alpha and get 31236.90.

   Bob's ideal EOQ is 1,455.21. His minimal annual cost is \$31,236.90.

2. When Bob charges \$5 he usually sells 20 bars in a day. On the other hand, if Bob charges \$3 he usually sells 45 bars in a day.

   Given this data, Elasticity $E = -\dfrac{(q_1 - q_0)(p_0 + p_1)}{(p_1 - p_0)(q_0 + q_1)} = -\dfrac{(45 - 20)(5 + 3)}{(3 - 5)(20 + 45)} = 1.538$

   If Bob's point elasticity is $\varepsilon = 0.876$ when he charges \$5.50, should Bob raise or lower the price to increase his revenue? Or has Bob already maximized his revenue?

   Since $\varepsilon = 0.876 < 1$, this situation is inelastic. Revenue and price move in the same direction, so Bob should **raise** his price to increase his revenue.

Name: ANSWER KEY **Math 1030 Quiz #4B** (June 16$^{\text{th}}$, 2010)

1. Bob's store sells a lot of ice cream bars. In fact, Bob plans on selling 5000 bars this year. Suppose that Bob pays \$3 per bar and \$125 to get a shipment delivered. Bob has also estimated that his inventory costs are \$0.50 per bar per year (base inventory costs on the average with all the standard assumptions). If $C(x)$ is Bob's ice cream bar cost function...

   $$C(x) = 3(5000) + 0.50\left(\frac{x}{2}\right) + 125\left(\frac{5000}{x}\right)$$

   We punch in "`derivative of 3(5000)+0.50(x/2)+125(5000/x)`" into Wolfram Alpha and scroll down. Alpha found that the derivative has roots ± 1581.14. Throwing out the negative number we get that our ideal economic order quantity is $x = 1581.14$. To find the minimal cost, we need to plug our EOQ into $C(x)$. So we enter "`3(5000)+0.50(x/2)+125(5000/x) at x=1591.14`" into Alpha and get 15790.60.

   Bob's ideal EOQ is 1,591.14. His minimal annual cost is \$15,790.60.

2. When Bob charges \$6 he usually sells 10 bars in a day. On the other hand, if Bob charges \$4 he usually sells 25 bars in a day.

   Given this data, Elasticity $E = -\frac{(q_1 - q_0)(p_0 + p_1)}{(p_1 - p_0)(q_0 + q_1)} = -\frac{(25 - 10)(6 + 4)}{(4 - 6)(10 + 25)} = 2.143$

   If Bob's point elasticity is $\varepsilon = 4.321$ when he charges \$6, should Bob raise or lower the price to increase his revenue? Or has Bob already maximized his revenue?

   Since $\varepsilon = 4.321 > 1$, this situation is inelastic. Revenue and price move in the opposite direction, so Bob should **lower** his price to increase his revenue.