Math 131   Quiz 1 (A)

Name:..ID#:...

Q.1: A company produces a product for which the variable cost per unit is $3.50 and fixed cost is $20,000 per year. Next year, the company wants the total cost to be $48,000. Find the number of units of the product that company should make next year.

Sol: Let the number of units be $= x$, then $3.5x + 20000 = 48000$ gives $x = (48000 - 20000)/3.5 = 8000.0$.

Q.2: A company produces a product at a cost of $6 per unit. If fixed costs are $20,000 and each unit sells at $8, (a) at least how many units must be sold in order to earn a profit; (b) how many units must be sold in order to earn a profit of $15,000?

Sol: Let the number of units be $= x$, then

(a) $6x + 20000 < 8x$ gives $x > 10000$. So the company should make at least 10001 units to earn a profit.

(b) $8x - (6x + 20000) = 15000$ gives $x = (15000 + 20000)/2 = 17500$.

Q.3 Suppose that consumers will demand 800 units of a product when the price is $10 per unit, and 1000 units when the price is $8 per unit. Find the demand equation for the product assuming that price p and quantity q are linearly related.:

Sol: We have the two points $(800, 10)$ and $(1000, 8)$

Slope of the function is $m = \dfrac{10 - 8}{800 - 1000} = -\dfrac{1}{100}$ and $p = f(q) = \dfrac{-1}{100}q + c$.

But $f(800) = \dfrac{-1}{100}(800) + c = 10$ gives $c = 18$

So $p = f(q) = \dfrac{-1}{100}q + 18$

OR $q = f(p) = -100p + 1800$ if we consider the points as $(10, 800)$ and $(8, 1000)$.

Q.4: Find a general linear equation of the line that passes through point (-6, 4) and has slope -2.

Sol: $y - 4 = -2(x + 6)$ or $y = -2x - 8$.