International Institute for Technology and Management

Tutoring Sheet #6

Unit 05a : Mathematics 1

1. Suppose the supply and demand sets S and D for a particular Market are described as follows:
S consists of the pairs (q,p) such that **2p – 3q = 12**
and D consists of the pairs (q,p) such that : **2p + q = 20**
A. Determine :
a.)The supply function.
b.)The inverse supply function
c.)The demand function
d.)The inverse demand function
B. Sketch S and D and determine the Equilibrium set E=S $\bigcap$ D
Comment briefly on the interpretation of the results.

2. Suppose that the supply and demand functions for a good are :

$\mathbf{q^S(p) = bp - a}$ and $\mathbf{q^D(p) = - dp + c}$

where a,b,c and d are positive constants.

a.) Show that the equilibrium price is $\mathbf{p_0 =} \dfrac{c+a}{b+d}$

3. Find the equilibrium price and quantity given that the demand function $p + q^2 + 3q - 20 = 0$ and the supply function $p - 3q^2 + 10q = 5$.

4. The demand for a certain type of cosmetic is given by
$p = 500 - q$ where p is the price when q units are demanded:

a. Find the Revenue R, that would be obtained at the demand of q.
b. Graph the revenue function R.
c. From the graph estimate the price that would produce the maximum revenue.
d. What is the maximum revenue?

5. The fixed cost of producing a certain drug is 500 and the variable cost is 10 :

a. Find the total cost function TC to produce q items.
b. Find the cost of producing 25 items.
c. Find the Average cost of producing 50 items.
d. Find the average variable cost of producing 50 items.
e. Find the marginal cost.

6. A monopoly manufacturing a certain kind of machine tool ,the demand function is given by
$q = - 5p + 850$ .The cost of producing q items per week is
$C = q^2 - 10q + 300$:

a. Find the profit function $\prod$ in terms of q.
b. Find the quantity at which the company breaks even.

7. A firm has average variable cost:

$$q^3 + q^2 + \frac{e^{q+1}}{q} - \frac{1}{q}$$

and fixed costs of 11.Find the total cost function.

8. A monopolist's average cost function is given by :

$$9 + \frac{3}{10}q + \frac{30}{q}$$

Where q is the quantity produced, the demand function for the good is $q = 40 - \frac{4}{3}p$ .Determine expressions, in terms of q , for the revenue and the profit.

9. The cost per box for making q boxes of candy is
$C = q^2 - 10q + 32$:

a. How much does it cost per box to make 10 boxes.
b. Graph the cost function.
c. How many boxes should be made to keep the cost per box at a minimum.
d. What is the minimum cost per box?