International Institute for
Technology and Management

Tutoring Sheet # 20

Unit 05a : Mathematics 1

Homework to be submitted: # 1:a,b,c;2,3

1. Express the following system of equations in a matrix form,and Solve it using a matrix method:

a.)
$$x + y + 3z = 6$$
$$2x + y + z = 1$$
$$-5x - 2y + 2z = 7$$

b.)
$$x - y + z = 2$$
$$3x + y - 2z = 0$$
$$5x - 2y - z = 1$$

c.)
$$4x + y - 2z = 4$$
$$2x + 3y - 2z = 4$$
$$2x + 5y + 2z = 8$$

d.)
$$x+2y+z= 1$$
$$x + y = 1$$
$$3x+4y+z= 3$$

e.)
$$x+2y+z= 1$$
$$x + y = 1$$
$$3x+4y+z= 2$$

2. The supply function for a commodity takes the form : $q^S(p) = ap^2 + bp + c$,when p = 1 the quantity supplied is 5; when p = 2 the quantity supplied is 12 ;when p = 3 the quantity supplied is 23.Find a,b and c using a matrix method.

3. Three goods are sold in the same market.If their prices are p_1 , p_2 , p_3 ,then the demanded quantities q_1^D, q_2^D, q_3^D and the supplied quantities q_1^S, q_2^S, q_3^S are given by the equations :

$q_1^D = 45 - 2p_1 + 2p_2 - 2p_3$; $q_1^S = 2p_1 - 5$

$q_2^D = 16 + 2p_1 - p_2 + 2p_3$; $q_2^S = 2p_2 - 4$

$q_3^D = 30 - p_1 + 2p_2 - p_3$; $q_3^S = p_3 - 5$

The equilibrium prices are the non-negative numbers p_1^*, p_2^* , p_3^* with the property that when the prices are $p_1 = p_1^*$, $p_2 = p_2^*$, $p_3 = p_3^*$ then the supply and the demand of each quantity are equal.Using a matrix method find p_1^*, p_2^* , p_3^*