PRINCE SULTAN UNIVERSITY

MATH 101 FINITE MATH

MAJOR EXAM 1 28th MARCH 2010

Start : 4:00 pm
End: 5:30 pm

Name: ____

I.D. ___________________________

Time : Circle One (9 a.m.) (10 a.m.) (11 a.m.)

1. Answer all questions.
2. This exam consists of 1 Cover Sheet & 5 Question Sheets with 11 questions.
3. You can use a calculator, **NOT** a mobile phone.
4. No talking during the test.
5. Show all working out in the space provided.

Question No.	Max. Points	Points Scored
1,2,3	**16**	
4,5	**14**	
6,7	**16**	
8,9	**22**	
10, 11	**12**	
TOTAL	**80**	

1) [4 points] Find the equation of the line (in the General form) which contains the point $(-3,4)$ and is parallel to the line $2x-3y=6$.

2) [4 points] Find the x and y so that:

$$\begin{bmatrix} 3 & -2 & 2 \\ 1 & 0 & -1 \end{bmatrix} + \begin{bmatrix} x-y & 2 & -2 \\ 4 & x & 6 \end{bmatrix} = \begin{bmatrix} 6 & 0 & 0 \\ 5 & 2x+y & 5 \end{bmatrix}$$

3) [8 points]

a) Determine whether the following lines are intersecting, parallel or coincident:

$$L: \quad -x+y=2$$
$$M: \quad 2x-2y=-4$$

b) The given pairs of lines intersect. Find the point of intersection.

$$4x-2y=8$$
$$6x+3y=0$$

4) [8 points] The supply and demand equations for MP3 players have been determined to be given by the following, where p is the price in Riyals:

$$S = -420 + 12p \qquad D = 1830 - 6.75p$$

a) How many MP3 players are supplied when the price is SR 50?

b) Find the market price of the MP3 players.

c) Find the quantity of MP3 players demanded at the market price.

5) [6 points] In 1999 the average price of a two-bedroom apartment in Manchester, U.K. was £78,500. In 2003 the average price of a two-bedroom apartment rose to £86,500. Suppose that the relationship between price and time is linear.

a) Write an equation the relates the price P to the time t in years.

b) If this trend continues, what should the price in 2010 be?

6) [8 points] A company that manufactures bicycles has a fixed cost of $100,000. It costs $100 to produce each bicycle . The selling price is $130 per bike.

   a) Determine the revenue R from selling x bicycles.

   b) Determine the cost C of producing x bicycles.

   c) How many bikes must be sold to **break even**?

7) [8 points] Solve the following system using addition/elimination

(Do not use matrices) : $\begin{cases} 5x-2y-4z=3 \\ 3x+3y+2z=-3 \\ -2x+5y+3z=3 \end{cases}$

8) [8 points] Solve the following system using **matrices**: $\begin{cases} 2x+y-z=2 \\ x+3y+2z=1 \\ x+y+z=2 \end{cases}$

9) [14 points] The matrices *A*,*B*,*C* and *D* are defined below. Find (if possible):

$$A=\begin{bmatrix} 2 & 3 \\ 1 & 0 \end{bmatrix}, \quad B=\begin{bmatrix} 2 & -3 & 0 \\ -1 & 2 & -2 \end{bmatrix}, \quad C=\begin{bmatrix} 2 & 2 \\ 4 & -1 \\ 1 & 3 \end{bmatrix}, \quad D=\begin{bmatrix} 1 & 0 & 4 \\ 0 & 2 & 2 \\ 1 & -1 & 0 \end{bmatrix}$$

a) A^{-1}

b) A^2B

c) CD

d) $DC+C$

10) [4 points] What solution set is given by the matrix: $\left[\begin{array}{ccc|c} 1 & -1 & -2 & 2 \\ 0 & 1 & -10 & -1 \\ 0 & 0 & 0 & 0 \end{array}\right]$?

11) [8 points] Solve the system by using $X = A^{-1}B$, where X is the variable matrix, A^{-1} is the inverse of the coefficient matrix and B is the answer matrix:

$$\begin{cases} x - y + z = 8 \\ 2y - z = -7 \\ 2x + 3y = 1 \end{cases}$$