



PRINCE SULTAN UNIVERSITY

MATH 101

FINITE MATH

MAJOR EXAM 1

24th OCT. 2011

Start : 4:00 p.m.

End: 5:30 p.m.

Total Time: 90 minutes

Name: _____

I.D. _____

Instructor's Name: _____

1. Answer all questions.
2. This exam consists of 1 Cover Sheet & 4 Question Sheets with 9 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	12	
3,4	16	
5,6,7	12	
8,9	10	
TOTAL	50	

- 1) [6 points] Consider the following two lines:

$$L : 4x - 2y = 8$$

$$M : -3x - 2y = -13$$

- a) Find the point of intersection of the two lines L and M .

- b) Find the equation of the line (*in General form*) that is parallel to the line $2x + 3y = 8$ and passes through the point of intersection of the two lines L and M , found in part (a).

- 2) [6 points] In 2003 the average cost of a small car was \$14,500. In 2006 the average cost rose to \$15,450.

- a) Assuming the relationship between time and cost to be linear, develop a formula for predicting the average cost in any future year (*let y be the average cost and let x be the year*).

- b) Predict the average cost of a small car in 2009.

- 3) [9 points] A company produces a product for which the cost per unit is \$4 and the fixed cost is \$40,000. If the selling price for each unit is \$8:
- Find the number of units that must be sold for the company to break even.
 - Given that Profit = Revenue – Cost, find the number of units that must be sold for the company to make a profit of \$50,000.
 - If the company determined that they can only sell 8,000 units. What should the selling price be in order to guarantee no loss?
- 4) [7 points] The supply and demand equations for a commodity are as follows $S = 0.6p + 20$ and $D = -0.8p + 55$, where p is the price in dollars and S and D are in units of commodity.
- Find the market price and the quantity of supply S demanded at this price?
 - Graph both supply and demand equations accurately on a clear graph.



- 5) [6 points] Solve the system using matrices:
- $$\begin{aligned} x_1 + x_2 + 2x_4 &= -2 \\ -x_1 + 2x_2 + x_3 + 3x_4 &= 6 \\ -2x_1 - 5x_2 - x_3 - 9x_4 &= 2 \end{aligned}$$

- 6) [3 points] Find x and y so that: $\begin{bmatrix} 2x & 4 \\ -3 & 5y \end{bmatrix} + \begin{bmatrix} 3y & -2 \\ -2 & -y \end{bmatrix} = \begin{bmatrix} -5 & 2 \\ -5 & 12 \end{bmatrix}$

- 7) [3 points] Let $A = \begin{bmatrix} 3 & 0 \\ -1 & 2 \\ 1 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 2 & 4 \\ 3 & 1 & 5 \end{bmatrix}$. Find AB .

8) [6 points] Find the inverse of $\begin{bmatrix} 1 & 3 & 3 \\ 1 & 4 & 3 \\ 1 & 3 & 4 \end{bmatrix}$

9) [4 points] Solve the system:

$$\begin{aligned} x + 3y + 3z &= 0 \\ x + 4y + 3z &= 2 \\ x + 3y + 4z &= 1 \end{aligned}$$