PRINCE SULTAN UNIVERSITY

MATH 101 FINITE MATH

MAJOR EXAM 1 22nd MARCH 2006

Start : 4:00 pm
End: 6:00 pm

Name: _____

I.D. _____

Section: Circle One (8 a.m.– Sec. 43) (11 a.m. – Sec. 42)

١. Answer all questions
٢. This exam consists of 1 Cover Sheet & 6 Question Sheets with 10 questions.
٣. You can use a calculator, **NOT** a mobile phone.
٤. No talking during the test.
٥. Show all working out in the space provided.

Question No.	Max. Points	Points Scored
1,2	**14**	
3,4	**16**	
5,6	**14**	
7	**12**	
8,9	**18**	
10	**12**	
TOTAL	**86**	

١) [8 points] Consider the two lines $L: \ 4x+3y=2$ and $M: \ 2x-y=1$

a) Show that the two lines intersect.

b) Find the point of intersection.

٢) [6 points] Find the equation of the line, in **Slope Intercept Form**, containing the point $(-2,-5)$ which is perpendicular to the line containing the points $(-4,5)$ and $(2,-1)$.

٣) [8 points] The average score on the MATH 101 final has been steadily increasing over the last six years at PSU. In 2000 the average score was 62%, while in 2004 the average score was 70%. Assume the rate of increase is steady.

a) Write an equation that relates the average final score *S*, to time *t*, where *t* is the year.

b) If this trend continues what will be average final score in 2006?

٤) [8 points] Le Choc Confectionery Ltd. is a company that produces fine Belgian chocolates. The daily cost of producing each chocolate is $0.55 and each one can be sold for $2.50. The daily operational overhead is $300.

a) Determine the revenue R, that the company makes from selling *x* chocolates per day.

b) Determine the cost C, to the company for producing *x* chocolates per day.

c) How many chocolates must be sold every day to **break even**?

٥) [10 points] Solve the following system using the method of elimination, if the system has no solution, say that is inconsistent : $\begin{cases} x+y-z=6 \\ 3x-2y+z=-5 \\ x+3y-2z=14 \end{cases}$

٦) [4 points] Write the augmented matrix of the following system**. Do not attempt to solve it.** $\begin{cases} 4x_1-x_2+2x_3-x_4=4 \\ x_1+x_2+6=0 \\ 2x_2-x_3+x_4=5 \end{cases}$

٧) [12 points] Solve the following system using **matrices**: $\begin{cases} 2x+y+z=6 \\ x-y-z=-3 \\ 3x+y+2z=7 \end{cases}$

٨) [10 points] Find the inverse of $\begin{bmatrix} 1 & -1 & 1 \\ 0 & 2 & -1 \\ 2 & 3 & 0 \end{bmatrix}$

٩) [8 points] Solve the system by using A^{-1} the inverse of the co-efficient matrix

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

١٠) [12 points] Find the maximum and minimum values of the objective function $z = 10x + 12y$, subject to the following constraints:

$$\begin{cases} x + y \le 7 \\ 2x + 3y \le 18 \\ 2x + y \le 10 \\ x \ge 0 \\ y \ge 0 \end{cases}$$