# PRINCE SULTAN UNIVERSITY

## MATH 101 FINITE MATHS

## FINAL EXAM 23rd January 2007

**Start : 8:00 am**
**End: 10:30 am**

**Name** _____

**I.D.** _____

**Section:**

**Dr. Kamal Abodayeh**

١. Answer all questions.
٢. This exam consists of 5 pages, 11 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 |
|---|---|---|
| 1,2,3 | **18** | |
| 4,5,6,7 | **16** | |
| 8,9,10 | **20** | |
| 11 | **12** | |
| **TOTAL** | **100** | |

Q1. Find the equation of the line passes through the points (1, -2) and (3, 5).

Q2. The supply and demand equations for salt have estimated to be given by the equation

$D = -0.3p + 2$ $S = 0.5p + 0.5$

a) Find the market price.

b) What quantity of supply is demanded at this market price?

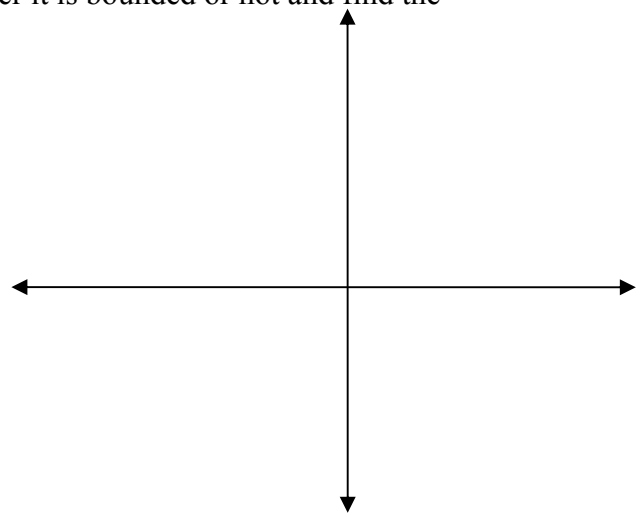
Q3. Given the matrix $A = \begin{bmatrix} 1 & 1 & -1 \\ 3 & -1 & 0 \\ 2 & -3 & 4 \end{bmatrix}$.

a) Find the inverse of A.

b) Solve the system
$$\begin{aligned} x + y - z &= 3 \\ 3x - y &= -4. \\ 2x - 3y + 4z &= 6 \end{aligned}$$

Q4. Graph the following system, determine whether it is bounded or not and find the corners.

$$\begin{cases} x+2y \geq 1 \\ y \leq 4 \\ x \geq 0 \\ y \geq 0 \end{cases}$$



Q5. Use the data in the following diagram to answer the following

a) How many elements are in A?

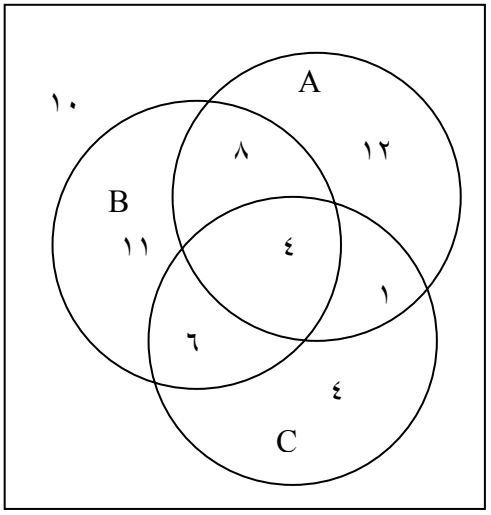
b) How many element are in A or B?

c) How many elements are in B but not in C?

d) Find the following probabilities

$P(C) =$

$P(C \mid A) =$




Q6. Use the binomial theorem to expand $(2x-1)^5$.

Q7. If $P(E) = 0.5$ and $P(F) = 0.7$ , and $P(E \cap F) = 0.3$, find each of the following probabilities:

$P(E \cup F) =$

$P(E \mid F) =$

$P(\overline{F}) =$

$P(\overline{E} \mid \overline{F}) =$

Q8. From a box containing 3 white, 2 green and 1 yellow ball, 2 balls are drawn without replacing the first before the second is drawn.

a) Sketch the tree diagram.

b) Find the probability that

(i) The first is white and the second is yellow.

(ii) One white and one yellow are drawn.

Q9. The following table summarizes the students at Prince Sultan University:

| | **PYP** | **Science** | **Business** | **Total** |
|---|---|---|---|---|
| **Male M** | 250 | 300 | 400 | 950 |
| **Female F** | 200 | 221 | 210 | 631 |
| **Total** | 450 | 521 | 610 | 1581 |

A student is selected at random from the grading class. Find the probability that the student

a) is male

b) is female science student

c) is female, given that the student is business student.

d) is not a PYP student and is male

Q10. In an experiment of tossing two fair dice, what is the probability of obtaining either sum of 7 or a sum of 11?

Q11. If $U$ = universal set $\{1,-1,2,-2,5,6\}$ and if $A = \{2,-2,5\}$, $B = \{1,2,5,6\}$ and $C = \{-1,-2\}$ find

a) $\overline{A} \cap \overline{B}$

b) $(A \cup B) \cap C$

c) $A \cup (B \cap C)$

d) $\overline{A \cap C}$

Q12. Consider the following matrices

$$A = \begin{bmatrix} 2 & 1 \\ -1 & 4 \end{bmatrix} \quad B = \begin{bmatrix} 2 & -1 \\ 4 & 0 \end{bmatrix} \quad C = \begin{bmatrix} 5 & 2 & 3 \\ 1 & 6 & -1 \end{bmatrix} \quad D = \begin{bmatrix} 3 & 1 \\ 2 & -1 \\ 4 & 1 \end{bmatrix}.$$

Find the following

A.C =

$D^T$ =

D(A + B)=

Q13. Maximize

$$P = x_1 + 2x_2 + 3x_3$$

subject to the constraints

$$2x_1 + x_2 + x_3 \leq 25$$

$$2x_1 + 3x_2 + 3x_3 \leq 30$$

$$x_1 \geq 0, x_2 \geq 0, x_3 \geq 0$$