Prince Sultan University

Department of Mathematics and Physical Sciences

Major III Exam

Semester II, 2008-2009 Spring (082)

13 June 2009

MATH 101 – Finite Mathematics

Time Allowed : 90 minutes

Student Name: **Section:**

ID Number: **Instructor's Name:**

Important Instructions:

1. You may use a scientific calculator that does not have programming or graphing capabilities.
2. You may not borrow a calculator from anyone.
3. You may not use notes or any textbook.
4. There should be no talking during the examination.
5. Your exam will be taken immediately if your mobile phone is heard.
6. Looking around or making an attempt to cheat will result in your exam being cancelled.
7. This exam has 12 problems, some with several parts and a total of 7 pages. Make sure your papers have all these problems.

Question	Maximum score	Your Score
Q.1, Q.2	14	
Q.3, Q.4	17	
Q.5, Q.6	18	
Q.7, Q.8	18	
Q.9, Q.10	19	
Q.11, Q.12	14	
Total	**100**	

Q.1 (6 points)

Let $U = \{0,1,3,5,-1,-4,-3,-11\}$, $A = \{1,3,-4,0,-3\}$ and $B = \{3,1,-11,5\}$. Find the following sets:

a) $\overline{A}$

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

c) $\overline{A \cup \overline{B}}$

Q.2 (8 points)

Suppose that 367 local managers were surveyed about their company's industry type and geographic location in Saudi Arabia. They were allowed to choose one industry type and one location. The results are given bellow

	Riyadh	Jeddah	Dammam	Yanbu
Manufacturing	40	37	43	31
Communication	54	23	21	13
Finance	32	54	12	7

a) Find the number of managers whose respond was not Jeddah.

b) Find the number of managers whose respond was Finance or Dammam.

c) Find the number of managers whose respond was Communication or Riyadh or Yanbu.

Q.3 (8 points)

Suppose you are forming a User ID consisting of 4 characters. For each character you could use the digits (2, 3, 4, 5, 6, 7, 8) and the letters (A, B, C, D, E).

How many different User ID can you form in the following cases?

a) if you are **not allowed** to repeat characters?

b) If characters are allowed to be repeated?

c) if you are **not allowed** to repeat characters and user ID starts with 2 letters and end up with 2 digits (for example AC24)?

Q.4 (9 points) A class consists of 10 girls and 15 boys. The instructor wants to pick a group of 5 to work on a project.

a) How many different groups can he choose?

b) How many different groups of 5 are made up of 3 boys and 2 girls?

c) How many different groups of 5 are made if they have at least 2 boys?

Q.5 (5 points)

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

Q.6 (13 points)

In a survey of 125 PSU students, it was founded that of three newspapers Okaz, Aljazeerah, and Alriyadh:
34 read Alriyadh, 27 read Aljazeerah, 18 read Okaz, 14 read Alriyadh and Aljazeerah, 11 read Alriyadh and Okaz, 8 read Aljazeerah and Okaz, 4 read all three.

a) Draw a Venn diagram to illustrate the situation.

b) How many read none of these newspapers?

c) How many read only Okaz?

d) How many read only one newspaper?

e) How many read neither Okaz nor Aljazeera?

f) How many read Alriyadh or Aljazeerah?

Q.7 (6 points)

On a single shelf we are to arrange 5 computer books and 6 mathematics books. In how many ways can this be done if the computer science books are to be grouped together and the mathematics books are to be grouped together?

Q.8 (12 points)

Consider the sample space $S = \{1,2,3,4,5\}$ and the events $E = \{1,3,4\}$ and $F = \{2,5\}$ such that $P(1) = 0.1$, $P(2) = 0.25$, $P(3) = 0.2$, $P(4) = 0.05$ and $P(5) = 0.4$. Determine the following probabilities:

a) $P(E)$

b) $P(F)$

c) $P(E \cap F)$

d) Are E and F mutually exclusive events? (Explain)

Q.9 (13 points)

Suppose E and F are events of sample space S. If $P(E) = 0.5$, $P(F) = 0.4$ and $P(E \cap F) = 0.15$.

I. Draw a Venn diagram to illustrate the situation.

II. Determine the following probabilities

a) $P(E \cup F)$

b) $P(\overline{E} \cap F)$

c) $P(\overline{E} \cup \overline{F})$

III. Find the **odds for** the event E.

Q.10 (6 points)

Find the coefficient of x^3 in the expansion of $(3x - 2)^{10}$.

Q.11 (5 points)

How many different 14-letter words (real or imaginary) can be formed from the letters in the word CONGRATULATION?

Q.12 (9 points)

Each of the eight possible blood types is listed in the table below along with the percent of KSA population having that type.

RH-positive	RH-negative
O Positive 38%	O Negative 7%
A Positive 34%	A Negative 6%
B Positive 9%	B Negative 2%
AB Positive 3%	AB Negative 1%

What is the probability a random selected person has a blood type

a) that is RH-positive?

b) that is type O?

c) that is type RH-positive or O?