King Fahd University of Petroleum and Minerals
College of Sciences, Prep-Year Math Program

Code 004

MATH 001
Exam II (Term 011)
Time Allowed: **90 Minutes**
November 10, 2001

Code 004

NAME:_____ ID#:_____ SECTION#:_____

Important Instructions
No Calculator, Pager or Mobile Telephone is allowed in the Exam

This Exam consists of 2 Parts.

Part I: **Q. 1-5 are Multiple Choice Questions. Encircle the correct answer.**

Part II: **Q1-6 are written questions. Provide neat and complete solution of each question.**

Looking around or making an attempt of cheating may cause your expulsion from the Place of Exam.

Please write your Name, ID number and Section # on the examination paper.

Part I (MCQ)	Part II	1 a	1 b	2 a	2 b	3 a	3 b	4 a	4 b	5 a	5 b	6 a	6 b

Total: /100

Part I (Encircle the Correct Answer in the following Questions) **[3 points each]**

1. The roots of the equation $3x^2+2x+1=0$ are

   a) Two distinct real numbers
   b) One real number
   c) Two distinct complex nonreal numbers
   d) One complex nonreal number

2. If a point (a, b) lies in the Quadrant II, then the point $(4, ab)$ lies in the

   a) Quadrant I
   b) Quadrant IV
   c) Quadrant III
   d) Quadrant II

3. Let $A=\{(4,7),(3,7),(2,5),(8,-8)\}$ and $B=\{(5,1),(-3,4),(-3,2)\}$ be two sets of ordered pairs of the form (x, y). We can define y as a function of x from

   a) the set B only
   b) the set A only
   c) both sets A and B.
   d) neither the set A nor the set B.

4. The equation $5m^{3/4}=-m^{1/2}$ has

   a) no real solution
   b) exactly two real solutions
   c) exactly three real solutions
   d) exactly one real solution.

5. The equation $2(y+2)-4=2y-3$ is

   a) a contradiction
   b) a conditional equation
   c) an identity
   d) equivalent to $2y+1=-5$

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Part II (Solve the following questions)

Important: Show all necessary steps in your solution

1a) **Solve** the equation for t : $m = \dfrac{t+z}{1-tz}$ (5 pts)

1b) **Solve** the equation: $|4-5x| = 4-5x$. (7 pts)

2a) The **sum** of the length and the width of a rectangle is $\frac{9}{2}$ cm. Find the **length** and **width** if the **area** of the rectangle is 5 sq. cm. (7 pts)

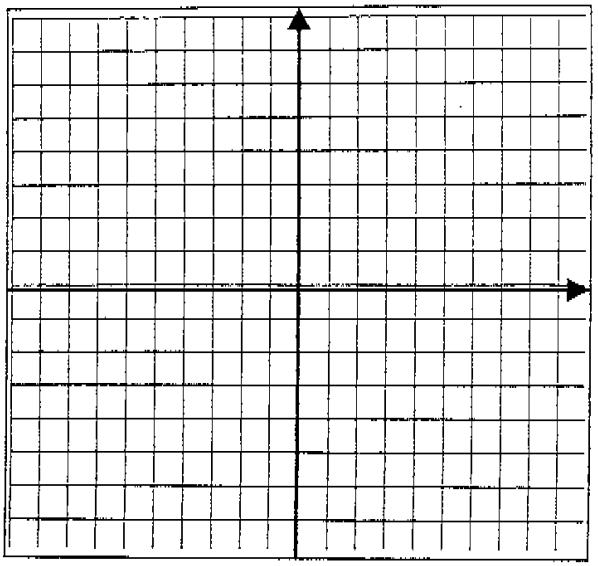
2b) **Solve** the equation: $\sqrt{x-3}=\sqrt{2\sqrt{x}}$. (8 pts)

3a) Find the **solution** of the inequality: $\frac{x^2+10}{x} \geq 11$.

Write your answer in the **interval notation**. (8 pts)

3b) If $m < n$, **solve** the inequality for x: $|m+n-2x| < n-m$. (8 pts)

4a) Given the function $f(x) = -|x+4|+3$, (8 pts)



i. **sketch** the graph of $f(x)$.

ii. use the graph of $f(x)$ to **find:**

a) the ***x* – intercept(s):**

b) the ***y* – intercept(s):**

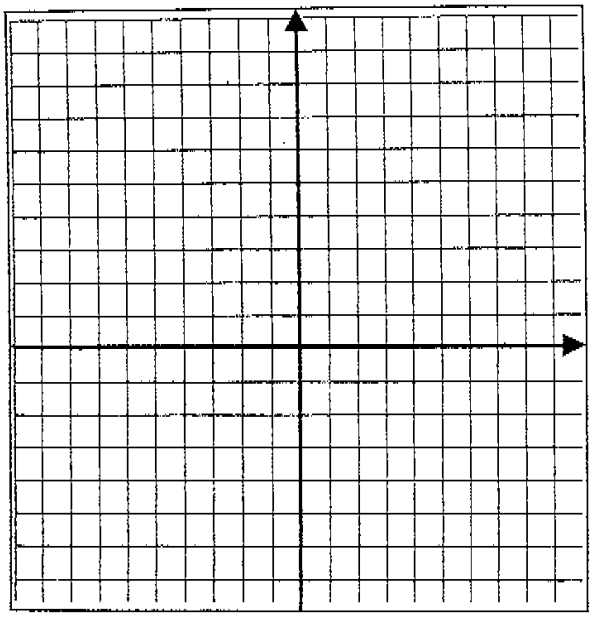
c) the **domain** of $f(x)$:

d) the **range** of $f(x)$:

e) the **axis of symmetry**:

4b) Find an **equation** of a **circle** that has a **diameter** with end points $(3,-1)$ and $(5,7)$. **Write** your answer in the **standard form**. (5 pts)

5a) Given the function $f(x)=\begin{cases} 3 & \text{if} \quad x \le -2 \\ x^2 & \text{if} \quad -2 < x \le 3 \\ -x+2 & \text{if} \quad 3 < x \le 7 \end{cases}$ (10 pts)



i. **sketch** the graph of $f(x)$.

ii. Use the graph of $f(x)$ to **find**:

a. the x – **intercept(s)**:

b. the y – **intercept(s)**:

c. the **interval(s)** where $f(x)$ is **increasing**:

d. the **interval(s)** where $f(x)$ is **decreasing**:

e. the **interval(s)** where $f(x)$ is **constant**:

5b) Let $g(x)=[\![x]\!]$, where $[\![\ ]\!]$ is the **greatest integer function**. Find the **value** of

$$\frac{g(x-a)+g(a-x)}{g\left(\frac{x}{a}\right)}$$

when $x = 1.5$ and $a = 0.6$. (5 pts)

6a) Given the **quadratic function** $f(x) = -2x^2 - 4x - 5$ (8 pts)

i. write $f(x)$ in the **standard form**

ii. find the **vertex**

iii. find the **axis of symmetry**

iv. find, if any, the **maximum value** of $f(x)$

v. find, if any, the **minimum value** of $f(x)$

vi. find the **range** of $f(x)$ in the **interval notation**

6b) If the **line** $(b^2 - 1)x - (b+1)y = b$ is **perpendicular** to the **line** $x + 2y = 1$, then find the **value** of b. (6 pts)