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

Math 001, Exam II
Term (002)
Sunday, April 22, 2001
6:30 - 8:10 p.m.

Code 004

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STUDENT's NAME:_____

ID #:_____ SECTION #:_____

This Exam consists of 2 parts

Part I: Multiple Choice Questions: *Encircle the Correct Answer Only*

Part II: Written Part: *You must show all necessary work for every Question*

Show All Necessary Work For Full Points

(Write Your Solution At the Proper Place Below The Question)

Question	Points	Student's Score
Part I: (1-6)	18	
Part II: 1	6	
2	8	
3	10	
4	8	
5	8	
6	6	
7	8	
8	10	
9	12	
10	6	
Total	100	

Code: 004

Part I : Multiple Choice Questions

Encircle the Correct Answer Only
(3 marks for each question)

1. If the monic quadratic equation $ax^2 + bx + c = 0$ has roots 0 and -2, then $a + b + c =$

    (a) 1

    (b) 3

    (c) -1

    (d) -2

2. Which one of the following statements is FALSE?

    (a) The slope of a line that is neither horizontal nor vertical is any real number m.

    (b) The three points $(0,0), (1,2)$, and $(3,6)$ lie on the same straight line.

    (c) A straight line whose slope is undefined must be a vertical line.

    (d) A straight line with slope zero must be a horizontal line.

1

3. The solution set of the inequality $|5x + 3| > 0$, in interval notation, is :
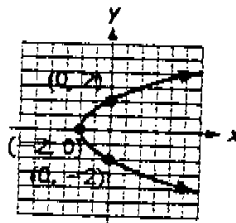
(a) $(0, \infty)$

(b) $(-\infty, \infty)$

(c) $\emptyset$

(d) $\left(-\infty, -\dfrac{3}{5}\right) \cup \left(-\dfrac{3}{5}, \infty\right)$

4. Which one of the following graphs is not the graph of a function?
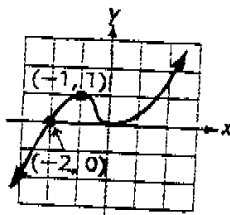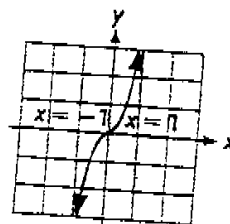
a)

b)

c)

d)

2.
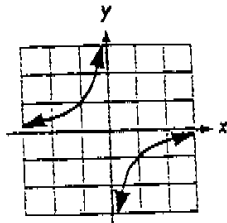
5. If $t = \dfrac{-ax}{a - x - t}, a \neq t,$ then the value of $3x + 1$ is equal to

(Hint: Find the value of x first)

(a) $-3t + 1$

(b) $3t - 1$

(c) $t - 3a$

(d) $3at + 1$

6. If f is a linear function such that $f(3) = 0$ and $f(6) = -2,$ then $f(12)$ is equal to:

(a) 4

(b) -4

(c) -6

(d) 6

3

PART II : WRITTEN PART
(SHOW YOUR ALL NECESSARY WORK FOR FULL POINTS)

1. Find the solution set, in the interval notation for the compound inequality
$$2x + 5 > 1 \text{ and } 7x + 6 \le 3(x + 2) \qquad \text{(6 points)}$$

$$2x > -4 \qquad \Big| \qquad 7x + 6 \le 3x + 6$$
$$x > -2 \qquad \Big| \qquad 4x \le 0$$
$$\qquad\qquad\qquad x \le 0$$

$$\Rightarrow SS_1 = (-2, \infty) \qquad SS_2 = (-\infty, 0)$$

and $\Rightarrow \cap$

$$SS = SS_1 \cap SS_2$$
$$= (-2, \infty) \cap (-\infty, 0) = (-2, 0)$$

2. Solve the equation $(x-2)^{\frac{2}{3}} - (8x - 16)^{\frac{1}{3}} = 3$ (8 points)

$$(x-2)^{2/3} - 8^{1/3}(x-2)^{1/3} = 3$$
$$\Rightarrow (x-2)^{2/3} - 2(x-2)^{1/3} - 3 = 0$$

let $y = (x-2)^{1/3}$ —— ①

$$\Rightarrow y^2 - 2y - 3 = 0 \Rightarrow (y-3)(y+1) = 0$$
$$\Rightarrow y = 3, \quad y = -1$$

Now $y = (x-2)^{1/3} = 3 \Rightarrow x - 2 = 3^3 = 27 \Rightarrow \boxed{x = 29}$

$y = (x-2)^{1/3} = -1 \Rightarrow x - 2 = (-1)^3 = -1 \Rightarrow \boxed{x = 1}$

3. (a) Find all values of k for which the equation

$kx^2 + (2k + 6) x + 16 = 0$
has two equal roots.   (5 points)

(b) Find the solution set for the equation
$$\frac{4}{x+3} + \frac{3}{x+4} = \frac{4}{x^2+7x+12}.$$ (5 points)

4. Find the solution set for the equation

$$\sqrt{3x+1} - \sqrt{x+4} = 1 \qquad\qquad \text{(8 points)}$$

5. Find the solution set, in interval notation, for the inequality

$$\frac{3 - 2x - x^2}{x^2 + 4x + 3} \leq 0$$ (8 points)

6. If M (p, q) is the mid-point of the line joining A(1, -2) and B(-3, 1), then find the slope of the line joining M(p, q) and C(1, 1).   (6 points)

7. If $f(x) = \frac{1}{x}, g(x) = \sqrt{3-x}$, find the function $(g \circ f)(x)$ and its domain   (8 points)

8. If $f(x) = \begin{cases} \frac{x+1}{2}, & \text{if } x < 1 \\ x-2, & \text{if } x \geq 1 \end{cases}$

   and $g(x) = [5x]$, where $[\ ]$ is the greatest integer function, then find the value of each of the following:

   (i) $(f \div g)\left(-\frac{1}{4}\right)$ (5+5 points)

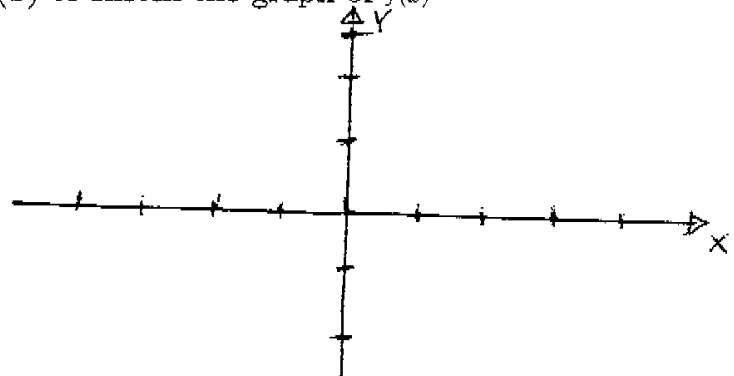   (ii) $(g \circ f)\left(\frac{8}{3}\right)$

9. Consider the function $f(x) = 2 - |x|$
Find the following:

(a) x-intercept(s) (if any):   (2 points)

(b) y-intercept (if any):   (2 points)

(c) Use (a) and (b) to sketch the graph of $f(x)$
(4 points)

(d) Find the domain and range of the function f.
(4 points)

10. The length L of a rectangular field is twice its width. Suppose that the area of the field is <u>at least</u> 1800 square feet. Find all possible values of L.
(6 points)