Prince Sultan University
Orientation Mathematics Program
MATH 001
Midterm Examination
Semester II, Term 082
Saturday, April 18, 2009
Time Allowed: 90 minutes ($1\frac{1}{2}$ *hour*)

Student Name: _____

Student ID #: _____ Section #: _____

Teacher'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 seen or heard
6. Looking around or making an attempt to cheat will result in your exam being cancelled
7. This examination has 11 problems, some with several parts. Make sure your paper has all these problems.

Problems	Max points	Student's Points
1,2,3,4	20	
5,6,7	20	
8	15	
9	15	
10	15	
11	15	
Total	100	

Q.1 (4 points) Evaluate $5x+3(2y-x)$ for $x=-3$ and $y=5$.

Q.2 (4 points) Let $A=\left\{0\ ,\ 1\ ,\sqrt{18}\ ,\ -3\pi\ ,\sqrt{64}\ ,\ -9\ ,\ -\frac{3}{5},\ 0.\overline{13}\right\}$

(You may use the same number more than once)

(i) List all the rational numbers in A.

(ii) List all the integers in A.

Q.3 (8 points) Simplify each of the following expressions. Assume that all variables represent positive numbers.

(i) $\left(\dfrac{(-2)^0 x^{-2} y^{-\frac{2}{3}}}{(3)^{-2} x^{-4} y^{\frac{10}{3}}}\right)^{-2}$

(iii) $-3\sqrt{50x^5}+2x\sqrt{32x^3}$

Q.4 (4 points) Find all numbers that must be **excluded** from the domain of the rational expression

$$\frac{x-9}{x^2+7x-18}$$

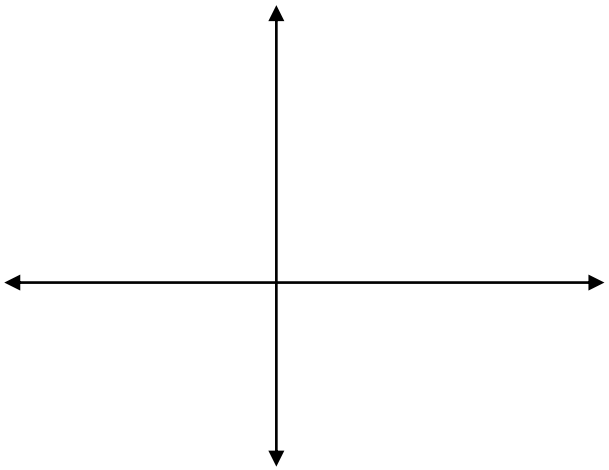
Q.5 (8 points) Perform the indicated operations and write the result in form $(a+bi)$.
(show all your steps without using a calculator)

(i) $\left(\sqrt{-3}-4\right)\left(\sqrt{-3}+4\right)$

(ii) $\dfrac{5+3i}{4-2i}$

Q.6 (7 points) Let $y=2-|x|$.

(i) Graph the equation $y=2-|x|$



(ii) Determine the $x-$intercepts, if any.

(iii) Determine the $y-$intercept, if any.

Q.7 (5 points) Solve the following equation and determine whether the equation is
<u>*an identity, a conditional equation, or an inconsistent equation.*</u>

$$\frac{1}{x+5}+\frac{2}{x+3}=\frac{-2}{x^2+8x+15}$$

Q.8 (15 points) Perform the indicated operations and simplify as much as possible.

(i) $(8x-3y)^2$

(ii) $(3x-2)(4x^2+3x-5)$

(iii) $\dfrac{x^2+4x+4}{x^2+5x+6} \div \dfrac{x^2-3x-10}{x^2+3x}$

(iv) $(-7x^7+9x^6-2x^5-9)+(2x^7-5x^6-8x^5-2)$

(v) $\dfrac{\frac{1}{x}-\frac{1}{2}}{\frac{1}{3}-\frac{x}{6}}$

Q.9 (15 points) Factor each of the following completely:

(i) $3x^4 - 9x^3 - 30x^2$

(ii) $x(x+2)^{-\frac{3}{5}} + (x+2)^{\frac{2}{5}}$

(iii) $5xy + 20y - 15x - 60$

(iv) $3x^4 - 12x^2$

Q.10 (15 points) Solve each of the following equations.

(i) $-6x+2-2(x+1)=6x+6$

(ii) $2|x-3|-6=10$

(iii) $\sqrt{2x-3}+x=3$

(iv) $x^{\frac{2}{3}}-4x^{\frac{1}{3}}+3=0$

Q.11 (15 points) *Solve* each of the following inequalities and *graph* the solution set on a number line. Express the solution set using *interval notation.*

(i) $6x + 5 > -2(x - 3) - 25$

(ii) $-3 \le \frac{2x + 5}{3} < 6$

(iii) $-4|x + 2| + 5 \le -7$