Prince Sultan University
Orientation Mathematics Program

Math 001
Midterm Examination
Semester I, Term 101
Monday, November 8, 2010

Time Allowed: 100 minutes

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 10 problems, some with several parts. Make sure your paper has all these problems.

Problems	**Max points**	**Student's Points**
1	12	
2,3	24	
4	16	
5,6,7	15	
8,9	17	
10	16	
Total	**100**	

1. (12 points) Simplify each of the following expressions

i. $20x^2 + 9 - 4[5(x^2 - 2) + 3]$

ii. $(81x^{12}y^8)^{\frac{1}{4}}$

iii. $\dfrac{(-7x)^0 x^{-2} y^{-2/3}}{3x^{-8} y^{10/3}}$

iv. $\dfrac{\sqrt[5]{96\,x^7}}{\sqrt[5]{3x^2}}$

2. (8 points) Evaluate the following

i. $\dfrac{x^2+4y-|7-5y|}{10(x-2)}$ for $x=5$, $y=2$

ii. x^2-2x+2 for $x=1+i$ (**simplify your answer**)

3. (16 points) Factor and simplify each of the following **completely**

i. $16x^4-81$

ii. x^3+27

iii. $\left(x^2+3\right)^{-2/3}+x\left(x^2+3\right)^{-5/3}$

iv. $x^3-3x^2+4x-12$

4. (16 points) Perform the indicated operations and simplify (**Do not use calculator**)

i. $3\sqrt{8}-\sqrt{32}+3\sqrt{72}-\sqrt{81}$ (**Show all your steps**)

ii. $(8x^5+2x)(7x^2-9)$

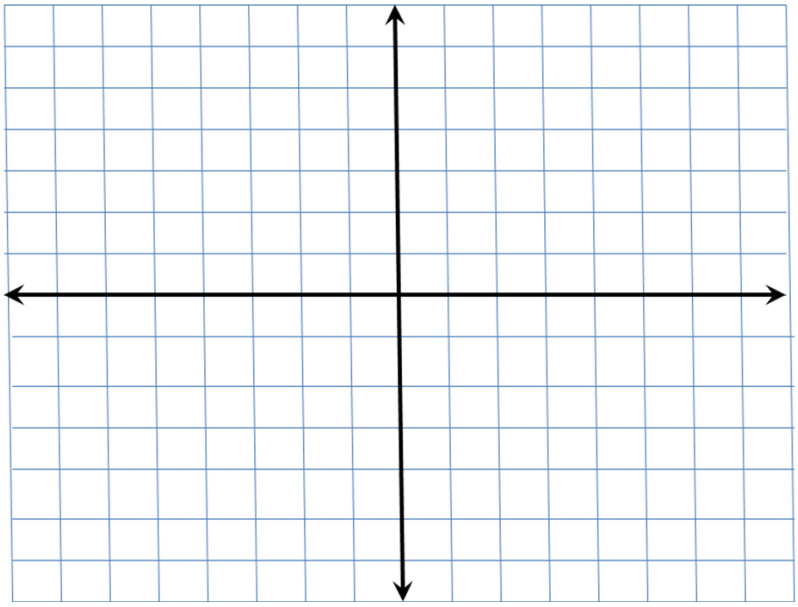
iii. $\left(7x^4y^2-5x^2y^2+3xy\right)+\left(18x^4y^2-6x^2y^2-xy\right)$

iv. $\dfrac{x^2+12x+35}{x-3}\cdot\dfrac{x^2-7x+12}{x^2+7x+10}\div\dfrac{x^2+3x-28}{x^2+3x+2}.$

5. (4 points) Find all numbers that must be excluded from the domain of $\dfrac{x-1}{x(x^2+11x+10)}$.

6. (5 points) Rationalize the denominator of $\dfrac{2\sqrt{12}}{\sqrt{12}+\sqrt{3}}$. (**Do not use calculator and show all your steps**).

7. (6 points) Graph the equation $y=3-|x|$ using integers for x between $x=-4$ and $x=4$. Determine x – intercept(s) and y – intercept(s) (**if any**).



8. (12 points) Perform the indicated operations and write the result in the standard form of a complex number $a+ib$. (**Do not use calculator** and s**how all your steps**).

i- $(2+i)^3$

ii- $\dfrac{7-\sqrt{-1}}{5+2i}$

iii- $\sqrt{-8}(\sqrt{-3}-\sqrt{5})$

9. (5 points) Given $y_1=\dfrac{x+7}{4}$ and $y_2\dfrac{x-1}{6}$. Find all values of x satisfying the condition $y_1-y_2=3$

10. (16 points) Find the solution set for each of the following equations

i. $\frac{3}{2x-2}+\frac{1}{2}=\frac{2}{x-1}.$

ii. $3(x-4)^2=15.$

iii. $x^2+4x+1=0.$

iv. $3x^2-12x=0.$