# PRINCE SULTAN UNIVERSITY

Department of Mathematical Sciences

## MATH 001 Midterm Examination

Sunday, 27 November 2005

Time allowed: 120 minutes

Student Name: _____

Student ID number: _____

Section: _____

Teacher's Name: _____

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. If your mobile phone is seen or heard, your exam will be taken immediately.
6. You must show all your work beside the problem. Be organized.
7. You may use the back of the pages for extra space, but be sure to indicate that on the page with the problem.
8. This examination has 10 problems, some with several parts. Make sure your paper has all these problems.

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

1. (20 points) Perform the indicated operations and simplify

(i) $(7x^2y+1)(2x^2y-3)$

(ii) $(2x-3)^3$

(iii) $\left(\frac{-15a^4b^2}{5a^{10}b^{-3}}\right)^3$

(iv) $\frac{x}{x^2-2x-24}-\frac{x}{x^2-7x+6}$

(v) $[(3x+y)^2+1]^2$

2. (8 points) Factor each of the following completely.

(i) $3x^3 - 30x^2 + 75x$

(ii) $(x+3)^{\frac{1}{2}} - (x+3)^{\frac{3}{2}}$

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

3. (12 points) Solve each of the following equations.

(i) $\dfrac{6}{x+3} + 2 = \dfrac{-2x}{x+3}$

(ii) $2(x+2) + 2x = 4(x+1)$

4. (8 points) Perform the operations and write the result in the standard form $a+ib$

(i) $(-5+4i)(3+7i)$

(ii) $\dfrac{8i}{4-3i}$

5. (12 points) Solve each of the following equations:

(i) $3x^2 = 6x - 1$

(ii) $\dfrac{1}{x} + \dfrac{1}{x+2} = \dfrac{1}{3}$

(iii) $\sqrt{6x+7} - x = 2$

(iv) $(x+5)^{\frac{3}{2}} = 8$

6. (4 points) Simplify the radical expression. Your answer should be in **radical** form

$$3\sqrt[3]{24}+\sqrt[3]{81}$$

7. (16 points) Solve each of the following inequalities. Express the solution set using **interval notation**.

(i) $-4(x+2)>3x+20$

(ii) $-11<2x-1\le -5$

(iii) $\dfrac{3}{x+3}>\dfrac{3}{x-2}$

(iv) $-x^2+x\ge 0$

8. (8 points) Find the slope and the y-intercept of the line whose equation is $4x+6y+12=0$ . Then **graph** it (Plot at least 3 points).

9. (8 points) Complete the square and write the equation in standard form. Then give the center and radius of the circle and **graph** it.

$$x^2+y^2-6y-7=0$$

10. (4 points) Find the distance between the pair of points. **Round** the answer to two decimal places. $(2\sqrt{3}\ ,\ \sqrt{6}\ )$ and $(-\sqrt{3}\ ,\ 5\sqrt{6}\ )$