Prince Sultan University
Orientation Mathematics Program
MATH 001
Midterm Examination
Semester I, Term 052

Time Allowed: 90 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. Provide an organized complete solution for each Question.
8. This examination has 13 problems. Make sure your paper has all these problems.

Problems	Max points	Student's Points
1,2	19	
3,4	23	
5,6,7,8	16	
9,10	16	
11	16	
12,13	10	
Total	100	

Provide a complete solution for the following Questions:

Q1. (15 points) Perform the indicated operations or simplify each of the following expressions to the simplest form:

i) $\dfrac{\sqrt[4]{162x^{5}}}{\sqrt[4]{2x}}$

ii) $\left(-x^{3}y^{4}\right)^{3}\left(\dfrac{x^{5}y^{6}}{7}\right)^{-2}$

iii) $\dfrac{(70\,x^{12})^{0}y^{-3}}{5\;\;(x^{16}y^{-4})^{0}}$

iv) $\left(\dfrac{-16a^{9}b^{3}}{2\,a^{6}b^{-3}}\right)^{\frac{1}{3}}$

v) $\dfrac{4x^{2}+10}{x-3}\div\dfrac{6x^{2}+15}{x^{2}-9}$

Q2. (4 points) Rationalize the denominator of $\dfrac{2\sqrt{11}}{\sqrt{11}+\sqrt{3}}$ and simplify. Show all your steps.

Q3. (8 points) Find the product the following expressions:

i) $(x^2y^2-5)^2$

ii) $(3xy^2-4y)(3xy^2+4y)$

Q4. (15 points) Factor and Simplify. Show all your steps.

i) x^3-x^2-5x+5

ii) $x^2-14x+45$

iii) $9x^2-25y^2$

iv) $64x^3+27$

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

Q5. (4 points) Add or subtract terms whenever possible $4\sqrt{72}-2\sqrt{48}+8\sqrt{3}$

Q6. (4 points) Simplify the rational expression: $\dfrac{\frac{1}{x}+\frac{1}{y}}{x+y}$

Q7. (3 points) Rewrite each expression without absolute value bars.

i) $\left|\sqrt{2}-7\right|$

ii) $\left|3-\pi\right|$

iii) $\left|4-\left(5-\frac{1}{2}\right)\right|$

Q8. (5 points) Find all numbers that must be excluded from the domain of the rational expression:

$$\frac{x^3-1}{x^2(x^2+11x+10)}$$

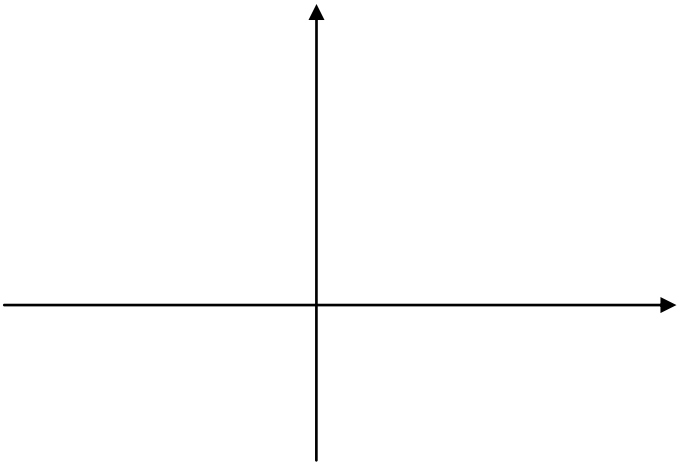
Q9. (8 points) Solve each of the following equations, if no solution explain why:

i) $\dfrac{3x}{3x-9}=\dfrac{3}{x-3}+9$

ii) $4x-7=4(x-1)+3$

Q10. (8 points) Let $y=4-|x|$

i) Graph the equation $y=4-|x|$ using the integers between $x=-4$ and $x=4$



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

iii) Determine the $y-$intercepts, if any, for the graph.

Q11. (16 points) Perform the indicated operation(s) and write the result in the standard form $a+ib$ for:

i) $(7-5i)(-2-3i)$

ii) $\left(\frac{-\sqrt{27}}{4}+\sqrt{3}\ i\right)^2$

iii) $\frac{7-\sqrt{-1}}{5+2i}$

iv) $\sqrt{-2}\ (\sqrt{-32}-\sqrt{-8})$

Q12. (5 points) Evaluate: $x^2 - 2x + 5$ for $x = -2i$ Show all your steps and simplify your answer

Q13. (5 points) Find all values of x satisfying the given conditions:

$y_1 = \frac{x+1}{4}$, $y_2 = \frac{x-2}{3}$, and $y_1 - y_2 = -4$