Prince Sultan University
Department of Mathematical Sciences

MATH 001
Major I Examination
Semester I, Term 171
Tuesday, October 25, 2017
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 of cheating may cause you expulsion from the Exam.
7. This examination has 10 problems, some with several parts and a total of 5 pages including the cover page. Make sure your exam paper has all these pages with all the problems.

Problems	Max points	Student's Points
1 , 2 , 3 , 4	20	
5 , 6 , 7	22	
8	23	
9 , 10	15	
Total	80	

20

Show all your steps

Q.1 (3 points) **Evaluate** $\dfrac{6-4|x-3|}{|x|-1}$, for $x=-3$

Q.2 (2 points) Find $\{1,3,5,7\}\cap\{2,3,6,7,10\}\cup\{3,9,12\}$

Q.3 (12 points) **Simplify** each of the following expressions **as much as possible.**

a) $8-3[(2x-3y)-5(x-2y)]$

b) $-3\sqrt{50x^5}+2x\sqrt{32x^3}$; assume $x>0$

c) $\left[\dfrac{12x^{-4}y^{-2}w^5}{3x\,y^{-2}w^{-3}}\right]^{-3}$

d) $\left(-3x^3y^{-2}\right)\left(7x^3y^{-1}\right)$

Q.4 (3 points) **Rationalize** the denominator. $\dfrac{6}{\sqrt{17}-\sqrt{5}}$

Q.5 (15 points) **Factor and simplify** the following expressions completely.

a) $3x^3 - 2x^2 - 12x + 8$

b) $6x^2 - 18x - 60$

c) $x^4 - 10x^2y^2 + 9y^4$

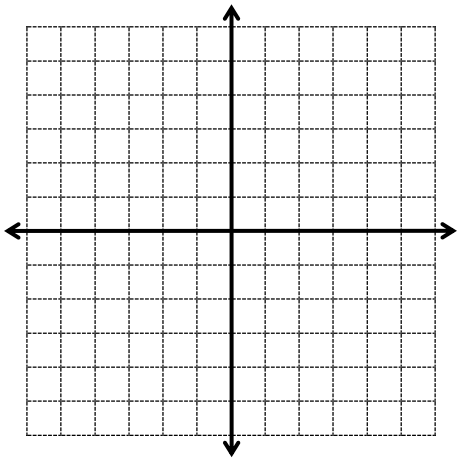
d) $8x^3 - 32x^2 - 40x$

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

Q.6 (3 points) Use the **absolute value** to find the **distance** between the two numbers.

–50 and –9

Q.7 (4 points) Graph the equation $y = 2x^2 - 4$. **(Use 5 points)**



Q.8 (23 points) **Perform** the indicated operation(s) and **simplify as much as possible**.

a) $(-7x^7+9x^5-2x^2-9)-(2x^7-5x^5+8x^2-3)$

b) $(2x-y)(2x+y)-(x-y)^2$

c) $(2x+3)^3$

d) $(5x^2-4y)(5x^2+4y)$

e) $\dfrac{x^2-7x}{x^2-6x-7}\cdot\dfrac{x^2-1}{x^2}$

f) $\dfrac{15x^2+10}{x-7}\div\dfrac{12x^2+8}{x^2-49}$

g) $\dfrac{x}{x^2-16}-\dfrac{5}{x^2+5x+4}$

Q.9 (12 points) **Solve** each of the following equations.

a) $x+3-(x-2)=3(x-4)-4(x-3)$

b) $\frac{5}{2x-4}+\frac{1}{x^2-2x}=\frac{3}{2x}$

c) $5+\frac{x-2}{3}=\frac{x+3}{8}$

Q.10 (3 points) Find all numbers that must be **excluded from the domain** of the rational expression:

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