Prince Sultan University
Department of Mathematics and Physical Sciences

Math 001
Final Examination
Semester I, Term 111
Wednesday, January 11, 2012
Time Allowed: 120 minutes

Student Name: _____

Student ID #: _____

Circle your section:

Instructor	Mr. Abid		Dr. Hamdi		Dr. Jehad		Dr. Younes		Dr. Thabet	Dr. Saleem	Dr. Kamal
Time	8--9	11--12	9--10	10--11	8--9	11--12	10--11	11--12	10--11	8--9	9--10
Section	204	202	207	209	205	206	212	211	201	245	203

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 17 problems. Make sure your paper has all these problems.

Problems	Max points	Student's Points
1,2,3,4,5	19	
6,7,8,9	20	
10,11	19	
12,13,14	20	
15,16,17	22	
Total	100	

1. (4 points) Simplify the following $(-3x^3y^{-2})(7x^3y^{-1})^{-2}$.

2. (4 points) Simplify the following $\sqrt{63x^2} - 2\sqrt{28x^2} + 5\sqrt{343x^2}$.

3. (4 points) Factor $x^4 - 81$ completely.

4. (2 points) Find the domain of the function $f(x) = \dfrac{1}{\sqrt{7-x}}$

5. (5 points) Determine the end behavior of the polynomial $f(x) = -3x^3(x-1)^2(x+3)$. Find the zeroes of the polynomial and state whether the graph crosses or touches and turns around the *x*-axis for each zero.

6. (6 points) Solve $\dfrac{2x-3}{x^2-7x+12}-\dfrac{2}{x-3}=\dfrac{1}{x-4}$.

7. (6 points) Write the equation of the line passing through the point $(2,-3)$ and perpendicular to the line $2x+6y-3=0$.

8. (4 points) Write $\dfrac{5+\sqrt{-9}}{4-\sqrt{-4}}$ in standard form. Do not use the calculator and show all your steps.

9. (4 points) Find the coordinates of the vertex for the parabola $f(x)=2x-x^2-2$. Determine whether the graph has maximum or minimum.

10. (13 points) Solve each of the following equations.

(i) $(3x+5)(x-3)=5$ (Do not use the calculator and show all your steps).

(ii) $2[3x-(4x-1)]-6(x-1)=0.$

(iii) $3|2x+1|+4=28.$

11. (6 points) Find the inverse function $f^{-1}(x)$ for $f(x)=\dfrac{x+2}{x-3}.$

12. (10 points) Solve each of the following inequalities and graph the solution set on a number line.

i. $-3 \le \frac{2x+5}{3} < 6$

ii. $-4|x+2|+5 \le -7$

13. (4 points) Let $f(x) = \sqrt{x-1}$ and $g(x) = \frac{x+1}{x-1}$. Evaluate $(f \circ g)(4) + (f+g)(4)$.

14. (6 points) Solve the equation $x^4 - 4x^3 - 9x^2 + 16x + 20 = 0$ given that 5 is a zero of $f(x) = x^4 - 4x^3 - 9x^2 + 16x + 20$. Do not use the calculator and show all your steps.

15. (6 points) Find the third degree polynomial with real coefficients satisfying that 2 and 7i are zeros and $f(1) = -100$.

16. (6 points) Solve the inequality $\frac{3}{x-2} \leq 1$ and write the solution set using interval notation.

17. (10 points) Use the graph to determine

a) the domain of f

b) the range of f

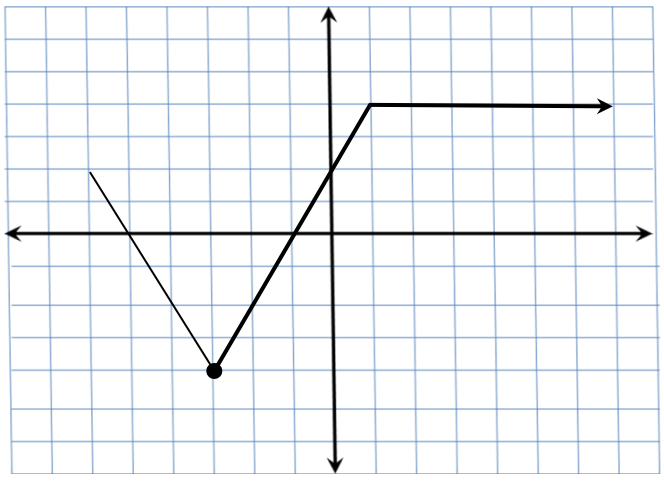
c) the $x-$ intercept(s).

d) the $y-$intercept.

e) the intervals on which f is increasing.

f) the intervals on which f is decreasing.

g) the intervals on which f is constant.



h) the value of $f(-2)$

i) whether f has an inverse or not. Explain your answer.