



Prince Sultan University
Department of Mathematical Sciences

MATH 002
Final Examination
Semester I, Term 111
Wednesday, January 11, 2012
Time Allowed: 120 minutes

Student Name: _____

Student ID #: _____

Mr. Khalid		Dr. Muaffaq
8 ---- 9	10 ---- 11	11---- 12
216	214	215

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

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

1. (6 points) Given $g(x) = -2 + 3^{-x}$ find:

a) Domain and Range of $g(x)$

b) Equation of horizontal asymptote

c) x and y -intercepts.

2. (8 points) Solve for x the following equations:

a) $2^{x-3} = 5^x$

b) $\log(1+x) = 1 + \log(1-x)$

3. (6 points) Use the reference angle to evaluate $\cos(240^\circ) - 3\csc(-240^\circ)$.

4. (8 points) Sketch the graph of one period of $f(x) = 2 \sin\left(2x - \frac{\pi}{3}\right)$

5. (8 points) Given that $\sin \alpha = \frac{3}{5}$ and α lies in Q1, and $\sin \beta = \frac{5}{13}$ and β lies in Q2, find the exact value of $\cos(\alpha + \beta)$

6. (6 points) Verify trigonometric identity: $(\sec x - \tan x)^2 = \frac{1 - \sin x}{1 + \sin x}$

7. (8 points) Graph the solution set of the system
$$\begin{cases} -2x + y \leq 0 \\ (x-2)^2 + (y-2)^2 < 4 \\ y > 1 \end{cases}$$

8. (8 points) Find the inverse of the matrix
$$\begin{bmatrix} 1 & 0 & 2 \\ -1 & 2 & 3 \\ 1 & -1 & 0 \end{bmatrix}$$

9. (4 points) Solve the system using A^{-1} , the inverse of the coefficient matrix

$$\begin{cases} 3x - 3y + z = 0 \\ -2x + 2y - z = 1 \\ -4x + 5y - 2z = 3 \end{cases} \quad \text{given that the inverse of } \begin{bmatrix} 3 & -3 & 1 \\ -2 & 2 & -1 \\ -4 & 5 & -2 \end{bmatrix} \text{ is } \begin{bmatrix} 1 & -1 & 1 \\ 0 & -2 & 1 \\ -2 & -3 & 0 \end{bmatrix}$$

10.(10 points) Solve the system using Cramer's rule $\begin{cases} x + y + z = 4 \\ x - 2y + z = 7 \\ x + 3y + 2z = 4 \end{cases}$

11.(6 points) Evaluate the following determinant

$$\begin{vmatrix} 4 & 2 & 8 & -7 \\ -2 & 0 & 4 & 1 \\ 5 & 0 & 0 & 5 \\ 4 & 0 & 0 & -1 \end{vmatrix}$$

12.(7 points) Graph the ellipse $36x^2 = 3600 - 100y^2$. Give the location of the foci.

13. (7 points) Write the equation of the parabola having focus (1,2) and directrix $x=-11$

14. (8 points) Consider the equation $\frac{(y+1)^2}{144} - \frac{(x-3)^2}{25} = 1$.

- a) Identify the conic represented by the above equation.
- b) Graph it.
- c) Locate the foci and find the equations of asymptotes (if any).