Prince Sultan University
Orientation Mathematics Program
MATH 002
Final Examination
Semester I, Term 071
Thursday, January 24, 2008
Time Allowed: 150 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. This examination has 17 problems, some with several parts. Make sure your paper has all these problems.

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

1. (3 points) Write $\sqrt[3]{64} = 4$ in the equivalent logarithmic form.

2. (4 points) As the population of a city increases, the pace of life also increases. The formula $W = 0.35 \ln P + 2.74$ models average walking speed, *W*, in feet per second, for a resident of a city whose population is *P* thousand. Find the average walking speed for people living in Riyadh with a population of 7323 thousand.

3. (4 points) Write $\frac{1}{3}\left[5\ln(x+6) - \ln x - \ln(x^2 - 25)\right]$ as a single logarithm.

4. (5 points) Solve $\log_2(x+3) + \log_2(x-3) = 4$.

5. (12 points) Consider the angle $\alpha = -570^\circ$.

(a) Graph the angle α in standard position. In which quadrant does α lie?

(b) Find a positive angle less than 360° that is co-terminal with α

(c) Convert α to radians.

(d) Find the reference angle of α

(e) Find the exact values of the six trigonometric functions of α

6. (5 points) Verify the identity $\left(\tan^2\theta+1\right)\left(\cos^2\theta+1\right)=\tan^2\theta+2.$

7. (5 points) Suppose that $\sec\alpha=2$, α lies in quadrant IV, and $\csc\beta=-3$, β lies in quadrant III. Find the exact value of $\sin\left(\alpha-\beta\right)$.

8. (5 points) Find all solutions of $7\cos\theta+9=-2\cos\theta.$

9. (9 points) Use the Gaussian elimination method or Cramer's rule to solve

$$x + 2y = z - 1$$
$$x = 4 + y - z \quad .$$
$$x + y - 3z = -2$$

10. (5 points) Find the standard form of the equation of the ellipse with endpoints of the major axis: $(2,2)$ and $(8,2)$; endpoints of the minor axis: $(5,3)$ and $(5,1)$.

11. (4 points) The angle of elevation of a building from a point on the ground 30 yards from its base is 37°. Find the height of the building to the nearest yard.

12. (7 points) Graph $9x^2 - 16y^2 - 36x - 64y + 116 = 0$. Locate the foci and find the equations of the asymptotes.

13. (6 points) Solve using addition / elimination method:
$$\begin{aligned} 3x + 2y - 3z &= -2 \\ 2x - 5y + 2z &= -2. \\ 4x - 3y + 4z &= 10 \end{aligned}$$

14. (7 points) Graph the solution set of each inequality
$$\begin{aligned} 2x + y &\le 6 \\ x + y &\ge 2 \\ 1 \le x &\le 2 \\ y &< 3 \end{aligned}$$
.

15. (8 points) Let $A=\begin{bmatrix} 1 & -1 \\ -2 & 3 \end{bmatrix}$ and $B=\begin{bmatrix} 2 & -1 \\ -1 & 0 \end{bmatrix}$. Find each of the following.

(a) AB

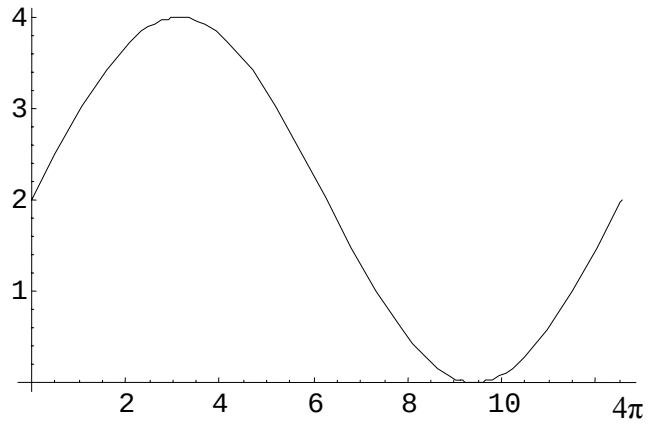
(b) $2A-B$

(c) A^2-3B

16. (6 points) Graph the parabola with the equation $(y+1)^2=-8(x+1)$. Show clearly the location of the vertex, focus and the directrix.

Answer only ONE of the following questions:

17. (5 points) The following graph represents the function $y = A\sin(Bx) + C$.
Find A, B and C.



17. (5 points) Evaluate the determinant $\begin{vmatrix} 3 & -1 & 1 & 2 \\ -2 & 0 & 0 & 0 \\ 2 & -1 & -2 & 3 \\ 1 & 4 & 0 & 0 \end{vmatrix}$.