PRINCE SULTAN UNIVERSITY

Department of Mathematical Sciences

MATH 002 Final Examination

February 6, 2010 (091)

Time allowed: 150 minutes

Student Name: _____

Student ID number: _____

Section: _____ Teacher's Name: _____

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

Problems	Max points	Student's Points
1,2,3,4	17	
5,6,7,8	17	
9,10,11	16	
12	8	
13	8	
14,15	13	
16	8	
17,18	13	
Total	100	

1. (4 points) Solve $6e^{6x} = 1458$.

2. (4 points) Expand $\log_2 \dfrac{x^2(x-1)^3}{(2x+1)^4}$.

3. (5 points) Use the information given to find the exact value of the remaining trigonometric functions of θ

   $\tan\theta = -\dfrac{2}{5}$ and $\csc\theta > 0$

4. (4 points) Solve $2\sqrt{3}\cos\theta - 3 = 0$ on the interval $\left[0, 360^\circ\right)$.

5. (4 points) Use a sketch to find the exact value of $\tan\left(\cos^{-1}\frac{8}{17}\right)$.

6. (5 points) given that $A=\begin{bmatrix}-2 & -4\\ 1 & 5\end{bmatrix}$, $B=\begin{bmatrix}2 & 0 & 6\\ -3 & 4 & 5\end{bmatrix}$, and $C=\begin{bmatrix}-1 & -3\\ 0 & 5\\ 9 & -7\end{bmatrix}$ Find

(i) $3A+BC$

(ii) A^{-1}

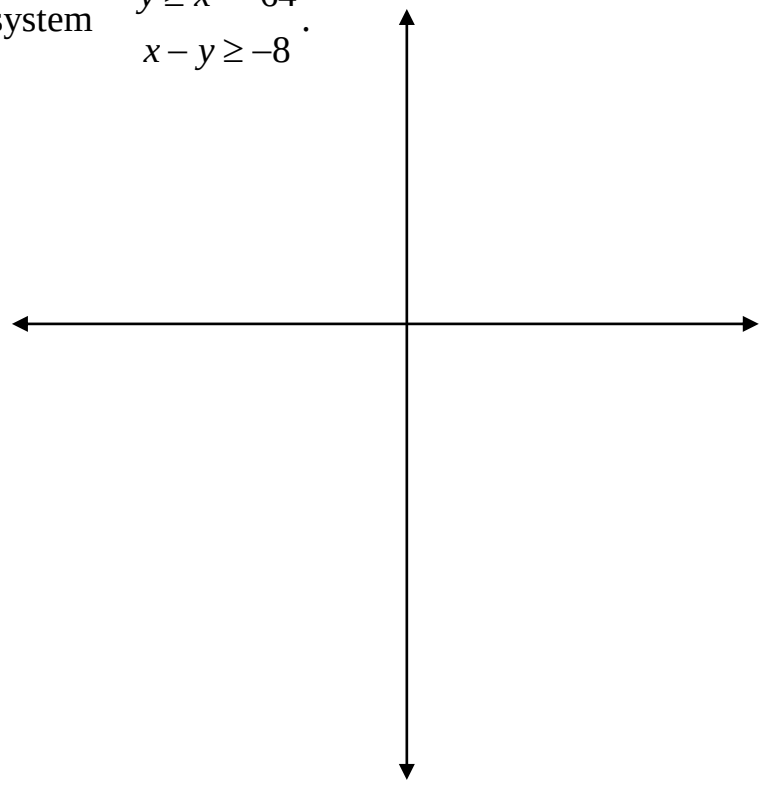
7. (4 points) The tallest television transmitting tower in the world is in North Dakota. From a point on level ground 5280 feet from the base of the tower, the angle of elevation is 30.3°. Approximate the height of the tower to the nearest foot.

8. (4 points) Verify the identity $\sin x\tan x+\cos x=\sec x$

9. (5 points) Use sketches to find the exact value of $\sin(\alpha+\beta)$ under the given conditions.

$\tan\alpha=\frac{3}{5}$, α is in $Q3$ and $\cos\beta=\frac{1}{3}$, β is in $Q4$

10. (6 points) Graph the solution set of the system $\begin{cases} y \geq x^2-64 \\ x-y \geq -8 \end{cases}$.



11.(5 points) Find the standard form of the equation of the parabola with focus: $(4,-1)$ and directrix: $x=8$

12.(8 points) (i) Find the **inverse** of the matrix $A = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 2 & 3 \\ 1 & 4 & 9 \end{bmatrix}$

(ii) Use the result of part (i) to solve the linear system $\begin{aligned} x + y + z &= 6 \\ x + 2y + 3z &= 14 \\ x + 4y + 9z &= 36 \end{aligned}$

13. (8 points) Use the **<u>elimination/addition</u>** method to solve the system

$$\begin{aligned} 5x + 3y - 2z &= 1 \\ x - y + z &= 6 \\ 2x + 2y - z &= -1 \end{aligned}$$

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14.(8 points) Use **Gaussian elimination(Matrices)** to find the solution of

$$x - 2y - z = 5$$
$$2x - 5y + 3z = 6$$
$$x - 3y + 4z = 1$$

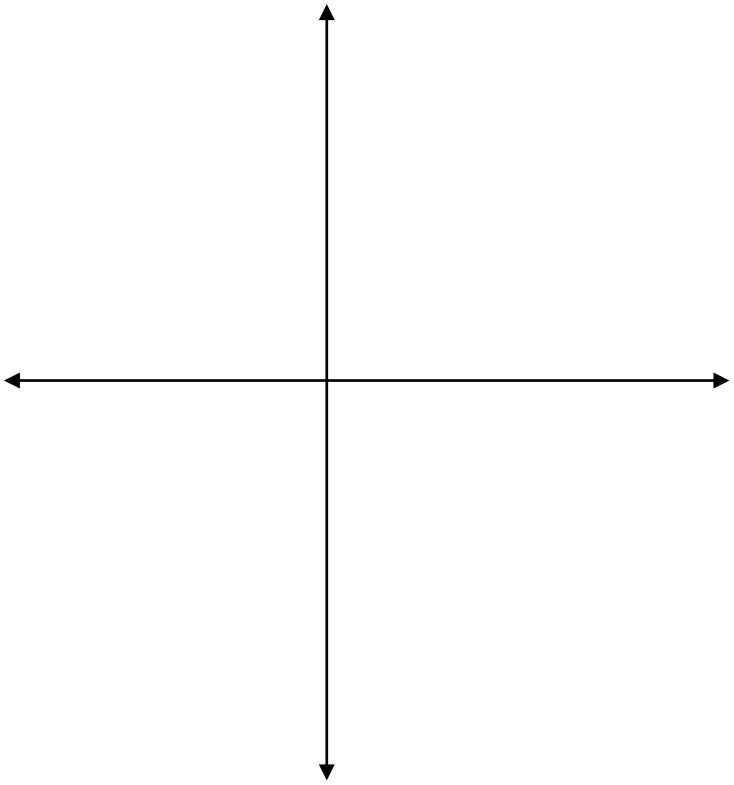
Give the solution, if any.

15.(5 points) Find the standard form of the equation of the ***Ellipse*** with: Major axis horizontal with length 10 ; length of minor axis $= 4$; center $(-3, 5)$

16. (8 points) Use **Cramer's Rule (Determinants)** to solve the following system of linear equations.

$$x + y - z = -3$$
$$2x + 3y + z = 2$$
$$2y + z = 1$$

17. (7 points) Graph $\frac{(x-3)^2}{4}-\frac{(y+1)^2}{9}=1$. Locate the foci and give the equations of asymptotes



18.(6 points) Graph the following equation: $9x^2+y^2+8x-4y-23=0$