Name _____

Instructor _____

Student ID # _____

EXAM

Dept. Use Only Exam Scores		
Problem	Points	Score
1.	20	
2.	20	
3.	20	
4.	20	
5.	20	
	TOTAL	

Math 1090

Show all your work and make sure you justify all your answers.

1. Use Gauss-Jordan elimation to solve the following equations (if a solution does not exist or there are infinitely many state so).

   (a) $x + z = 1$, $x + 3y = 1$, and $x + 6y + 5z = 2$.

   (b) $x + 2y + 3z = 1$, $x + 3y + 4z = 3$, and $2x + 5y + 7z = 2$.

2. Rework problem 64 on page 246

3. Let $A = \begin{pmatrix} 1 & 0 & 1 \\ 1 & 3 & 0 \\ 1 & 6 & 5 \end{pmatrix}$, $B = \begin{pmatrix} 1 & 2 & 3 \\ 1 & 3 & 4 \\ 1 & 1 & 2 \end{pmatrix}$. $C = \begin{pmatrix} 1 & 2 & 3 \\ 1 & 3 & 4 \\ 2 & 5 & 7 \end{pmatrix}$. Find the following if possible.

   (a) Find the inverse of A and use it to solve the equation $x + z = 1$, $x + 3y = 1$, and $x + 6y + 5z = 2$.

   (b) Find the inverse of B.

   (c) Find the inverse of C.

4. Find the maximium of the objective function $f = 5x + 4y$ subject to the constraints $x \geq 0$, $y \geq 0$, $3x + y \leq 9$, $3x + 2y \leq 12$, $x + 2y \leq 8$.

5. Find the minimum of the objective function $f = 40x + 25y$ subject to the constraints $x \geq 0$, $y \geq 0$, $x + y \geq 100$, $y - x \leq 20$, $-2x + 3y \geq 30$.

6. Suppose that you are the manager of a ski and snowboard shop. You sell skis for 70 dollars and snowboards for 300. You The cost of buying skis is 30 and the cost of buying snowboards for your shop is 50. It takes 7 hours of labor to assemble the skis, and 10 hours to assemble snowboards. If you have 2000 dollars to spend each month on skis and snowboards, and 420 worker hours how many skis and snowboards should you buy each month if you want to maximize revenue?

7. Graph the following functions

   (a) $y = 2^{-x}$

   (b) $y = log_5(x)$

8. Simplify the following or solve for x.

(a) $2^{log_2(3x+1)}$

(b) $log_3(3^2)$

(c) $3^x + 3^{x^2} = 1$

(d) $5^{3x} + 1 = 5^7$

(e) $log_2(x^2 + 1) = 8$

(f) $log_4(x) + log_4(x + 6) = 2$

9. The total cost for a good is given by $400ln(x+10)+100$ where x is the number of units produced.

   (a) When you produce 90 units what is the total cost?

   (b) How many units must you produce to have a cost of 200 dollars?

10. Suppose you invest 700 dollars into an account paying 5 percent annual interest how long before your investment doubles?

11. Redo and write up the solution to problem 31 on page 304.