

Math 118 Fall 2007
Practice Final Exam
Answers

Name:_____

PLEASE READ THESE INSTRUCTIONS

This practice test consists of 30 partial credit problems.

1. $x = 7, y = 2$

2. $p = \frac{93}{13} = 7.1538, q = \frac{35}{13} = 2.6923$

3. Infinitely many solutions: $x = -\frac{2}{3} + \frac{5}{3}y, y = y$

4. $x_1 = 2, x_2 = -1$

5. Infinitely many solutions: $x_1 = 8 + 3x_2, x_2 = x_2, x_3 = \frac{7}{4} + \frac{5}{4}y$

6. No solutions

7.

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & -2 \\ 0 & 0 & 1 & 0 \end{array} \right]$$

8.

$$\begin{cases} x_1 + x_2 + x_3 = 25 \\ 12x_1 + 18x_2 + 26x_3 = 330 \end{cases}$$

$$\left[\begin{array}{ccc|c} 1 & 1 & 1 & 25 \\ 12 & 18 & 26 & 330 \end{array} \right]$$

9.

$$\left[\begin{array}{cc} -12 & -4 \\ -4 & -8 \end{array} \right]$$

10. $x = -1, y = 1$

11. $a = -3, b = 2, c = -13, d = 8$

12.

$$\left[\begin{array}{ccc} -4 & -2 & 3 \\ -5 & -2 & 3 \\ 2 & 1 & -1 \end{array} \right]$$

13.

$$\begin{bmatrix} -3 & -2 & \frac{3}{2} \\ 4 & 3 & -2 \\ 3 & 2 & -\frac{5}{4} \end{bmatrix}$$

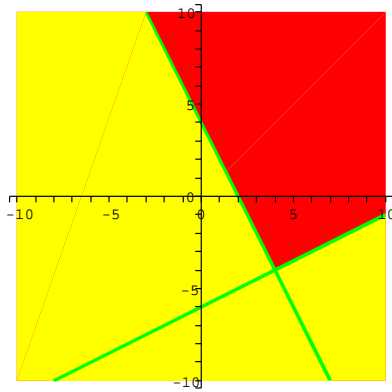
14. $x_1 = 3, x_2 = -2$

15. (A) $x_1 = -3, x_2 = 4$

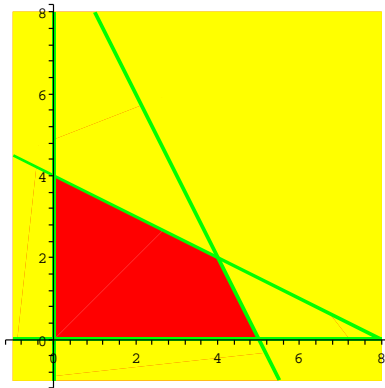
(B) $x_1 = -4, x_2 = 7$

16. $X = (A - I)^{-1}D$

17.

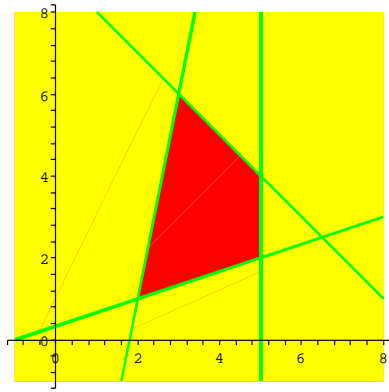


18.



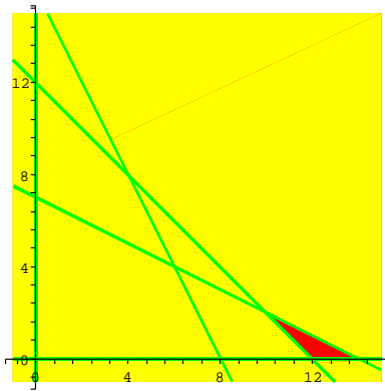
The corners are: $(0, 0)$, $(5, 0)$, $(0, 4)$, $(4, 2)$

19.



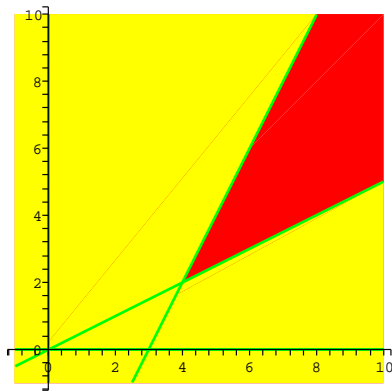
The corners are: $(2, 1)$, $(5, 2)$, $(5, 4)$, $(3, 6)$

20. The picture is:



z has a maximum of 160 at $(10, 2)$, and a minimum of 120 at $(12, 0)$.

21. The picture is:



No maximum or minimum.

22. 7 buses and 15 vans for a total cost of \$9,900

23.

$$\begin{cases} 2x_1 + x_2 + s_1 = 50 \\ x_1 + 2x_2 + s_2 = 40 \end{cases}$$

x_1	x_2	s_1	s_2
0	0	50	40
0	50	0	-5
0	10	40	0
25	0	0	15
40	0	-30	0
20	10	0	0

24.

$$\begin{cases} x_1 + x_2 + s_1 = 16 \\ 2x_1 + 2x_2 + s_2 = 20 \end{cases}$$

$$\left[\begin{array}{cccc|c} x_1 & x_2 & s_1 & s_2 & \\ \hline 0 & 0 & 16 & 20 & \\ 0 & 16 & 0 & 4 & \\ 0 & 20 & -4 & 0 & \\ 16 & 0 & 0 & -12 & \\ 10 & 0 & 6 & 0 & \\ 4 & 12 & 0 & 0 & \end{array} \right]$$

25. The pivot is the 2 in the s_1 column.

$$\left[\begin{array}{cccccc|c} x_1 & x_2 & s_1 & s_2 & s_3 & P & \\ \hline 0 & 0 & 1 & \frac{1}{2} & \frac{1}{2} & 0 & 1 \\ 1 & 0 & 0 & 2 & 3 & 0 & 7 \\ 0 & 1 & 0 & -\frac{5}{2} & -\frac{5}{2} & 0 & \frac{17}{2} \\ \hline 0 & 0 & 0 & 3 & -2 & 1 & 24 \end{array} \right]$$

26.

$$\left[\begin{array}{cccccc|c} x_1 & x_2 & x_3 & s_1 & s_2 & P & \\ \hline 2 & 3 & 2 & 1 & 0 & 0 & 1000 \\ 1 & 1 & 2 & 0 & 1 & 0 & 800 \\ \hline -7 & -8 & -10 & 0 & 0 & 1 & 0 \end{array} \right]$$

27.

$$P^2 = \begin{bmatrix} 0.7 & 0.3 \\ 0.45 & 0.55 \end{bmatrix} \quad S_2 = [0.575 \quad 0.425]$$

28.

$$P^2 = \begin{bmatrix} 0.28 & 0.72 \\ 0.24 & 0.76 \end{bmatrix}$$

$$P = 0.72$$

29.

$$S = \begin{bmatrix} \frac{2}{9} & \frac{7}{9} \end{bmatrix}$$

$$\bar{P} = \begin{bmatrix} \frac{2}{9} & \frac{7}{9} \\ \frac{2}{9} & \frac{7}{9} \end{bmatrix}$$

30.

$$P = \begin{bmatrix} 0.75 & 0.05 & 0.2 \\ 0.15 & 0.75 & 0.1 \\ 0.05 & 0.1 & 0.85 \end{bmatrix}$$

$$S = [0.25 \quad 0.25 \quad 0.5]$$