

Math 109 Test Three

Time: 50 minutes

Total: 20 marks

Name: _____

1. [2 marks] A feasible set has vertices $(0, 3)$, $(5, 0)$ and $(2, 5)$. Find the maximum value of $5x + 2y$ on the feasible set and state the point where the maximum occurs.

2. [3 marks] Find the equation of the line that is perpendicular to $y = \frac{2}{3}x + 7$ and that passes through the point $(6, -11)$.

3. [3 marks] List all the inequalities that apply:

A company makes backpacks and purses. Each backpack takes 4 hours to sew and 2 hours to dye. Each purse takes 5 hours to sew and 1 hour to dye. Each day the company has at most 100 sewing hours and at most 40 dyeing hours available. Let x be the number of backpacks made each day and let y be the number of purses made each day.

4. [3 marks] Find the intersection of $8x + 2y = -12$ and $-2x + y = 12$.

5. [2 marks] Graph the feasible set for the following system of inequalities:
 $x + y \leq 5, \quad -2x + y \leq 2, \quad x \geq 0, \quad y \geq 0$

6. [3 marks] Solve the following system using Gauss-Jordan Elimination:

$$\begin{array}{rcl} x - 4y & = & -23 \\ 2x - 7y & = & -38 \end{array}$$

7. [4 marks] Solve the following system using Gauss-Jordan Elimination:

$$\begin{array}{rcrcrcrcl} x & + & y & + & z & = & 6 \\ 2x & + & 4y & & & = & 14 \\ 5x & + & 9y & + & z & = & 34 \end{array}$$