Math 109 Test Three

Time: 50 minutes
Total: 25 marks

Name: _____

1. [2 marks] A feasible set has vertices $(5, 4), (4, 5)$ and $(2, 6)$.

a) Find the maximum value of $19x + 23y$ on the feasible set.

b) State the point where that maximum value occurs.

2. [4 marks] Find the equation of the line that passes through the point $(-3, 7)$ and is perpendicular to $y = -\frac{4}{5}x + 4$.

3. [4 marks] A company makes surfboards and paddleboards. Each surfboard takes 4 hours to manufacture and 2 hours to dye and generates $115 of profit. Each paddleboard takes 4 hours to manufacture and 3 hours to dye and generates $210 of profit. Each day the company has 48 manufacturing hours and 30 dyeing hours available. Let x be the number of surfboards made each day. Let y be the number of paddleboards made each day.

a) Write down the function that represents daily profit.

b) List all the inequalities that apply.

4. [4 marks] Find the point where the lines $6x+3y=-12$ and $-4x+8y=88$ intersect.

5. [3 marks] Find the equation of the line that passes through the points $(-10, 9)$ and $(2, 27)$.

6. [3 marks] Graph the feasible set. Shade in the region that satisfies all the inequalities.

$$\begin{aligned} x &\geq 0 \\ 2x + y &\leq 6 \\ y &\geq 4x \end{aligned}$$

7. [5 marks] Solve the following system using Gauss-Jordan Elimination:

$$\begin{aligned} x - 2y + 7z &= -2 \\ 3x - 4y + 17z &= 2 \\ 5x - 7y + 29z &= 2 \end{aligned}$$