

Math 109-003  
Assignment 3

Covers: Sections 1.2-1.4, 2.1-2.2, 6.1  
Due: Thurs March 12 at 8:30am

INSTRUCTIONS:

This assignment will be marked for completion.

Solutions will be posted on the course website 24 hours after the deadline.

You may not copy the work of another person or AI.

Submit jpg or pdf files to the D2L Dropbox.

1. A feasible set has vertices  $(4, 6)$ ,  $(6, 4)$  and  $(2, 7)$ .
  - a) Find the maximum value of  $21x + 26y$  on the feasible set.
  - b) State the point where that maximum value occurs.
  
2. A company makes backpacks and purses. Each backpack takes 4 hours to manufacture and 2 hours to test and generates \$50 of revenue. Each purse takes 3 hours to manufacture and 1 hour to test and generates \$70 of revenue. Each day the company has 96 manufacturing hours and 40 testing hours available. Let  $x$  be the number of backpacks made each day. Let  $y$  be the number of purses made each day.
  - a) Write down the function that represents daily revenue.
  - b) List all the inequalities that apply.
  
3. Graph the feasible set. Shade in the region that satisfies all inequalities.

$$\begin{aligned}y &\geq 0 \\2x + y &\leq 10 \\y &\leq 3x\end{aligned}$$

4. Manufacturer A can produce a product for \$561 plus \$4 per unit. Manufacturer B can produce a product for \$210 plus \$7 per unit. Let  $y$  be the cost (in dollars) and  $x$  be the number of units produced.
  - a) How many units make the costs equal?
  - b) What is the cost to produce this number of units?
  
5. Rewrite  $15x - 3y \leq 9$  in the form  $y \leq mx + b$  or  $y \geq mx + b$ .
  
6. It costs a t-shirt company \$400 to produce 10 t-shirts and \$498 to produce 17 t-shirts. Find the equation of the cost line, where  $y$  is the cost (in dollars) and  $x$  is the number of t-shirts produced.
  
7. Solve the following system using Gauss-Jordan Elimination:

$$\begin{aligned}x - 3y + 5z &= 13 \\2x - 5y + 8z &= 22 \\-2x + 2y + 3z &= 5\end{aligned}$$