Homework 2
Due Friday 01/18

1. Recall the diet problem discussed in class.

$$\begin{aligned} \max \quad & 50x_1 + 200x_2 + 100x_3 + 100x_4 && (1)\\ & \text{subject to} \\ & 10x_1 + 50x_2 + 15x_3 + 40x_4 \geq 200 && (2)\\ & 0x_1 + 20x_2 + 5x_3 + 10x_4 \geq 30 && (3)\\ & 0x_2 + 5x_3 + 20x_4 \geq 30 && (4)\\ & 50x_1 + 10x_2 + 30x_3 + 10x_4 \geq 70 && (5)\\ & x_i \geq 0 \qquad \forall i = 1, 2, 3, 4 && (6) \end{aligned}$$

   State whether the following points are feasible or infeasible. If infeasible, state one of the constraints that is violated.

   (a) (5,0,1,1)
   (b) (5,3,2,1)
   (c) (1,-1,4,5)
   (d) (1.5,2.2,3,1)

2. Model the following problem: You run a company and can make two items, paper and graph paper. One ream of paper and one ream of graph paper each take 1 cord of wood to make. A ream of paper requires one cartridge of ink to prink, while a ream of graph paper takes 2 ink cartridges. You also know that only 4 people want to buy a ream of graph paper. Your factory has 5 cords of wood and 6 ink cartridges on hand, and you want to maximize your revenue if one ream of paper sells for $2 and one ream of graph paper sells for $3.

3. Given the previous problem's model, graph the feasible region.

4. Based on the graph of the feasible region and objective function, give an optimal solution.