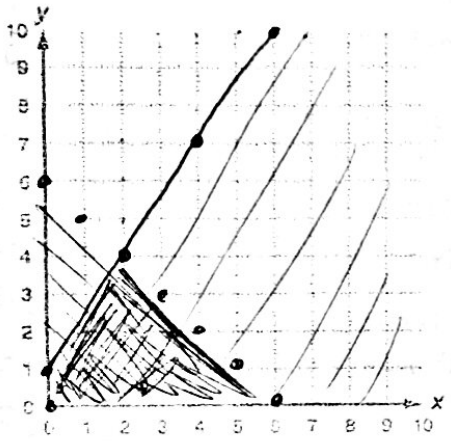
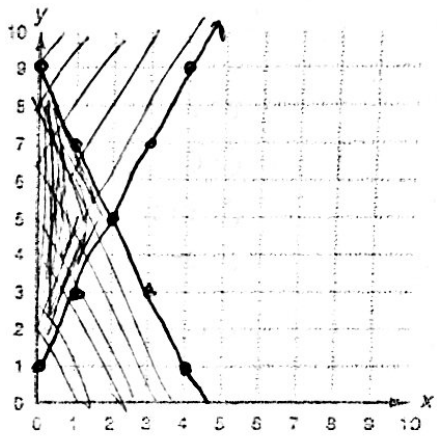
Linear Programming Graphing Practice #1

Graph each feasible region.

1. $\begin{cases} x \geq 0 \\ y \geq 0 \\ y \leq 1.5x + 1 \\ y \leq -x + 6 \end{cases}$



2. $\begin{cases} x \geq 0 \\ y \geq 0 \\ y \geq 2x + 1 \\ y \leq -2x + 9 \end{cases}$



Solve using the graphs from #1 & 2

3. Maximize $P = 2x + 5y$ for:

$\begin{cases} x \geq 0 \\ y \geq 0 \\ y \leq 1.5x + 1 \\ y \leq -x + 6 \end{cases}$

Vertices: (0,0) (0,1) (2,4) (6,0)

P(0 0) = 2(0) + 5(0) = 0

P(0 1) = 2(0) + 5(1) = 5

P(2 4) 2(2) + 5(4) = 24

P(6 0) = 2(6) + 5(0) = 12

Maximum value at (2,4)

4. Minimize $P = 3x + 6y$ for:

$\begin{cases} x \geq 0 \\ y \geq 0 \\ y \geq 2x + 1 \\ y \leq -2x + 9 \end{cases}$

Vertices: (0,1) (0,9) (2,5)

P(0,1) = 3(0) + 6(1) = 6

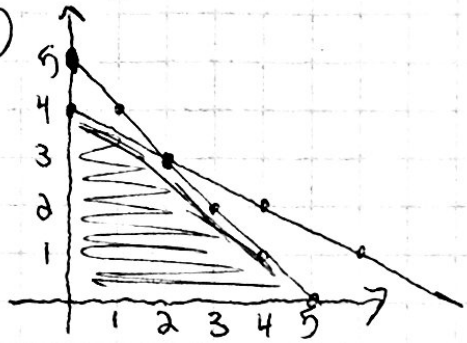
P(0,9) = 3(0) + 6(9) = 54

P(2,5) = 3(2) + 6(5) = 36

Minimum value at (0,1)

Pg 21

①



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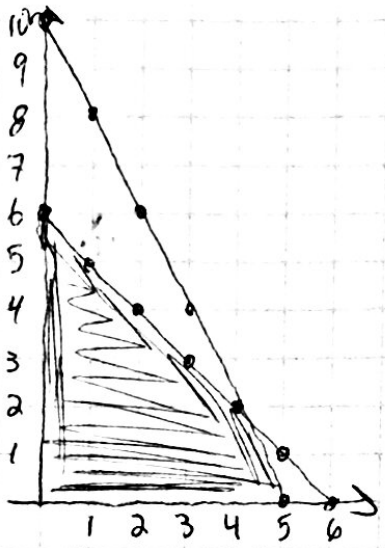

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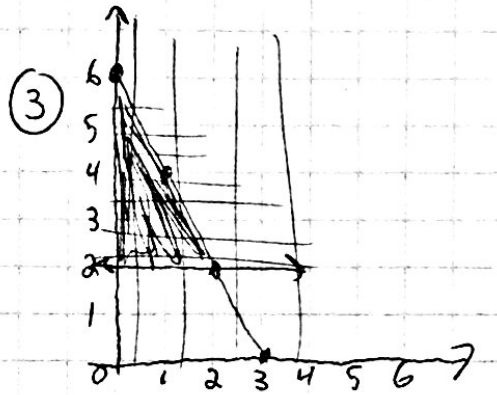

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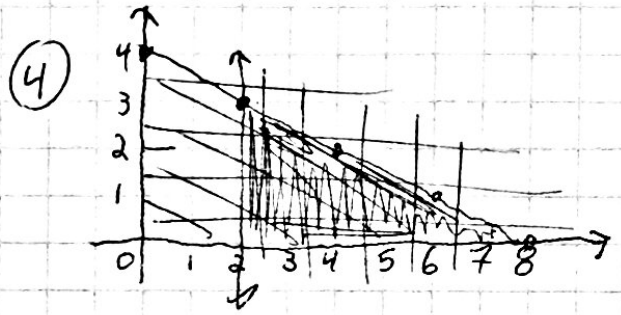

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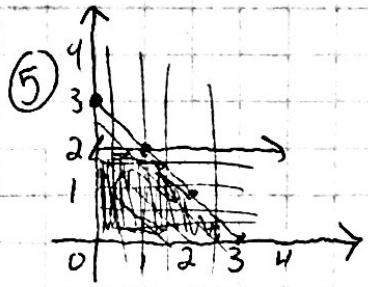

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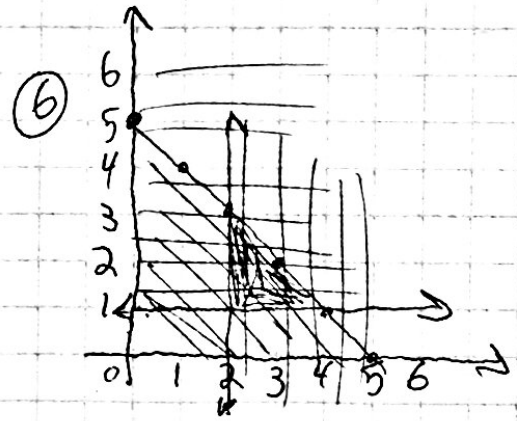

Pg 21 Work

Linear Programming Graphing Practice #2

Do all work on a separate sheet of graph paper.

1. p = x + 5y, find the maximum profit under these constraints:

$$\begin{cases} x + y \le 5 \\ x + 2y \le 8 \\ x \ge 0 \\ y \ge 0 \end{cases}$$

$y \le -x + 5$

$y \le -\frac{1}{2}x + 4$

(0,0): $0 + 5(0) = 0$

(0,4): $0 + 5(4) = 20$

(2,3): $2 + 5(3) = 17$

(5,0): $5 + 5(0) = 5$

2. p = 4x – y, find the maximum profit under these constraints.

$$\begin{cases} x + y \le 6 \\ 2x + y \le 10 \\ x \ge 0 \\ y \ge 0 \end{cases}$$

$y \le -x + 6$

$y \le -2x + 10$

(0,0): $4(0) - 0 = 0$

(0,6): $4(0) - 6 = -6$

(4,2): $4(4) - 2 = 14$

(5,0): $4(5) - 0 = 20$

3. c = 2x + 2y, find the minimum costs under these constraints:

$$\begin{cases} 2x + y \le 6 \\ x \ge 0 \\ y \ge 2 \end{cases}$$

$y \le -2x + 6$

(0,2): $2(0) + 2(2) = 4$

(0,6): $2(0) + 2(6) = 12$

(2,2): $2(2) + 2(2) = 8$

4. If cost is represented by c = x + 3y, find the minimum costs under these constraints:

$$\begin{cases} x + 2y \le 8 \\ x \ge 2 \\ y \ge 0 \end{cases}$$

$y \le -\frac{1}{2}x + 4$

(2,0): $2 + 3(0) = 2$

(2,3): $2 + 3(3) = 11$

(8,0): $8 + 3(0) = 8$

5. If profit is represented by p = 3x + 4y, find the maximum profit under these constraints:

$$\begin{cases} x + y \le 3 \\ x \ge 0 \\ y \le 2 \end{cases}$$

$y \le -x + 3$

(0,0): $3(0) + 4(0) = 0$

(1,2): $3(1) + 4(2) = 11$

(0,2): $3(0) + 4(2) = 8$

(3,0): $3(3) + 4(0) = 9$

6. If cost is represented by c = 2x + 3y, find the minimum costs under these constraints:

$$\begin{cases} x + y \le 5 \\ x \ge 2 \\ y \ge 1 \end{cases}$$

$y \le -x + 5$

(2,1): $2(2) + 3(1) = 7$

(2,3): $2(2) + 3(3) = 13$

(4,1): $2(4) + 3(1) = 11$