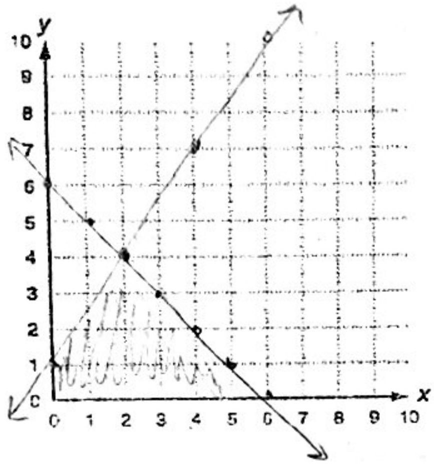
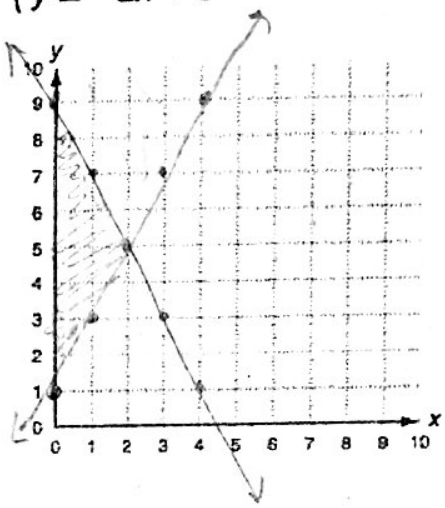
Linear Programming Graphing Practice #1

Graph each feasible region.

1. $\begin{cases} x \geq 0 \\ y \geq 0 \\ y \leq 1.5x + 1 \\ y \leq -x + 6 \end{cases}$ $\frac{3}{2}$



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

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

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

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

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

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) (2,5) (0,9)

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

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

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

Minimum value at (0,1)

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:

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

$y \le -x+5$

$2y \le -x+8 \quad y \le -\frac{1}{2}x+4$

Max (2,3)

$x+5y$

(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:

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

$y \le -x+6$

$y \le -2x+10$

Max (5,0)

$4x-y$

(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:

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

$y \le -2x+6$

Min (0,2)

$2x+2y$

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

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

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

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

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

$2y \le -x+8 \quad y \le -\frac{1}{2}x+4$

Min (2,0)

$x+3y$

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

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

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

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

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

$y \le -x+3$

Max (1,2)

$3x+4y$

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

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

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

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

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

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

$y \le -x+5$

Min (2,1)

$2x+3y$

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

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

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

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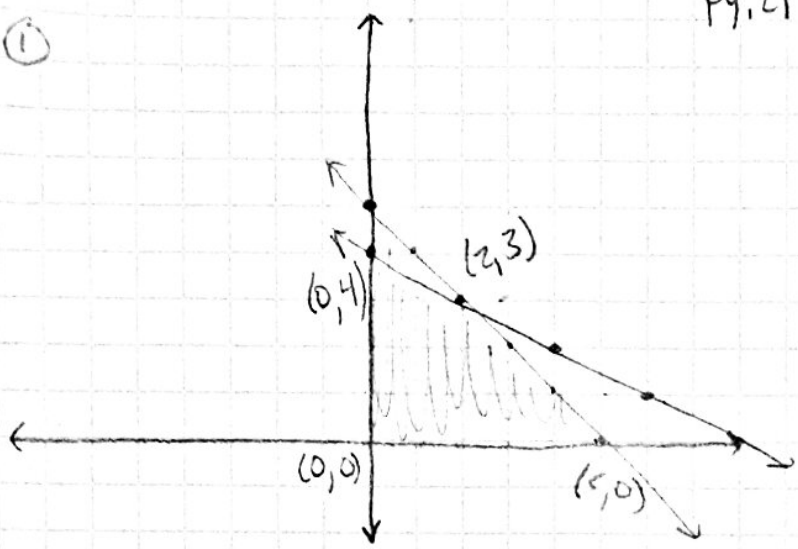

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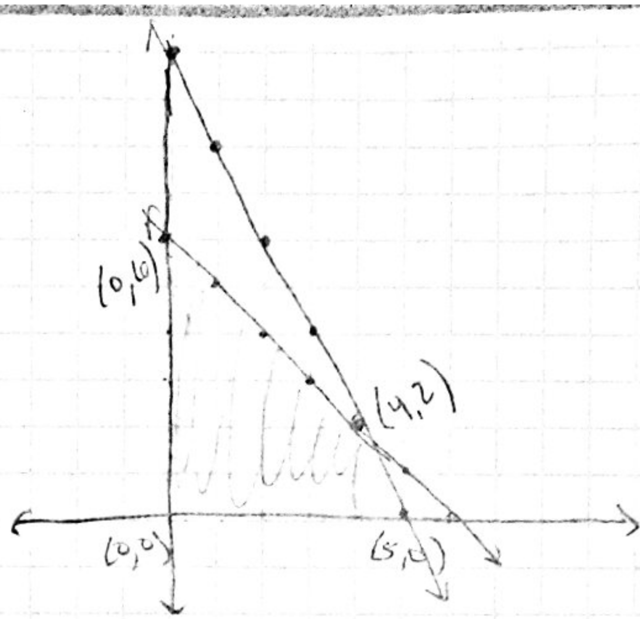

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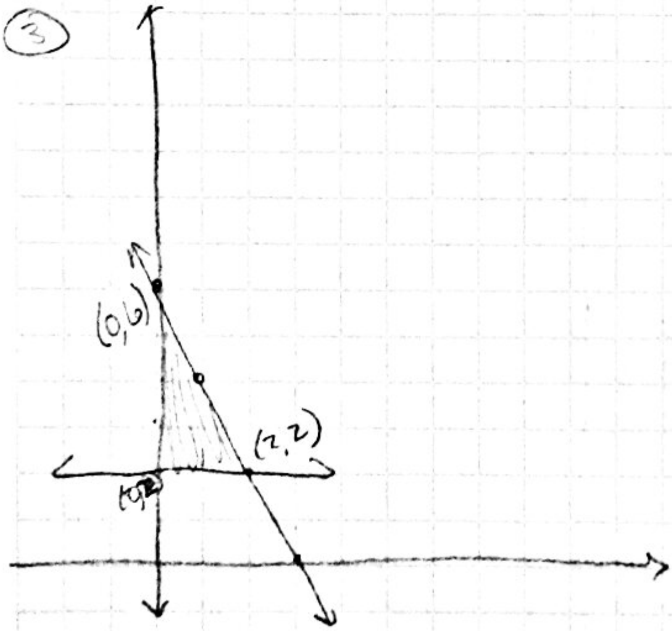

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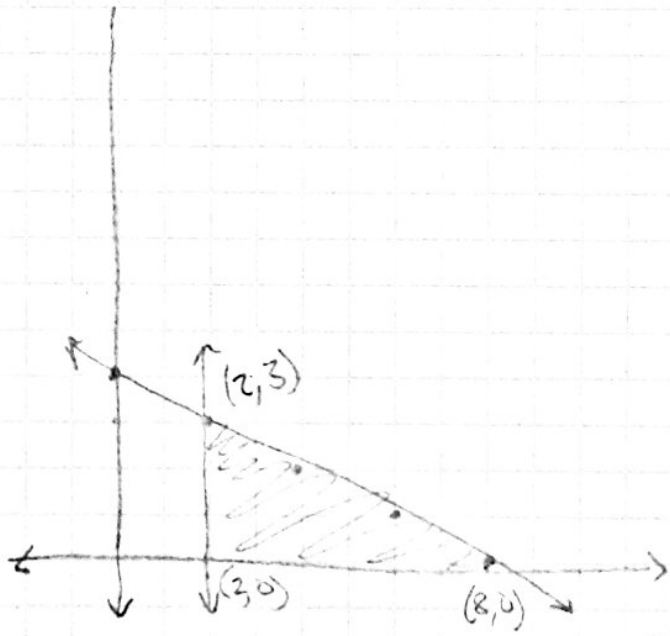

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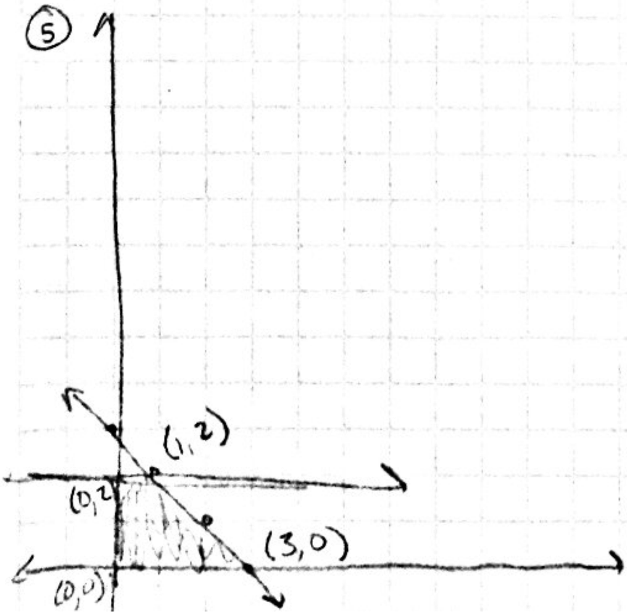

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