

Homework
12/10/13

JUICE BLEND

Jill B
Alex B
Elizabeth J
Shantez C

X variable: # of quarts Orange Juice
Y variable: # of quarts Raspberry Juice
Z variable: Profit

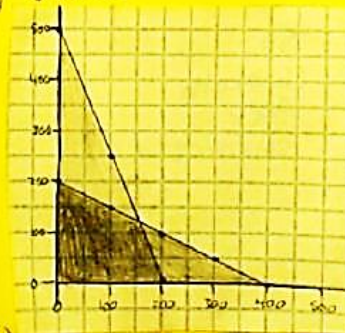
Profit equation: $Z = 0.5x + 0.4y$

1st constraint: $2.5x + 1y \leq 500$

2nd constraint: $1.5x + 3y \leq 600$

Common sense constraints:

$x \geq 0$ $y \geq 0$



Intersection Point:	Profit:
(0, 0)	0 \$
(0, 200)	80 \$
(200, 0)	100 \$
(150, 125)	125 \$

$$\begin{array}{r} 2.5x + 1y \leq 500 \\ -2.5x \quad -2.5x \\ \hline 1y \leq 500 - 2.5x \\ -1 \quad -1 \\ \hline y \leq 500 - 2.5x \end{array} \quad \begin{array}{r} 1.5x + 3y \leq 600 \\ -1.5x \quad -1.5x \\ \hline 3y \leq 600 - 1.5x \\ -3 \quad -3 \\ \hline y \leq 200 - 0.5x \end{array}$$

File Cabinet

By: Jenny Zander &
Dani Todd hr. 5

X Variable: # of Cabinet A's
Y Variable: # of Cabinet B's
Z Variable: Maximum Storage Space

1st Constraint: $600 \geq 75x + 50y$

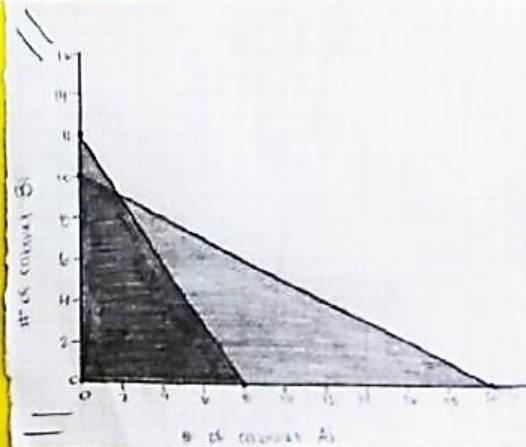
2nd Constraint: $60 \geq 3x + 6y$

Common Sense Constraint: $x \geq 0$ $y \geq 0$

Z equation: $Z = 12x + 18y$

$$\begin{array}{r} 600 \geq 75x + 50y \\ -75x \quad -75x \\ \hline 600 - 75x \geq 50y \\ \frac{600 - 75x}{50} \geq \frac{50y}{50} \\ 12 - 1.5x \geq y \end{array} \quad \begin{array}{r} 60 \geq 3x + 6y \\ -3x \quad -3x \\ \hline 60 - 3x \geq 6y \\ \frac{60 - 3x}{6} \geq \frac{6y}{6} \\ 10 - \frac{1}{2}x \geq y \end{array}$$

Intersection Points:	Storage Space:
0, 0	0 sq. feet
0, 10	180 sq. feet
2, 9	186 sq. feet
8, 0	96 sq. feet



He should purchase 2 Cabinet A's
and 9 Cabinet B's.

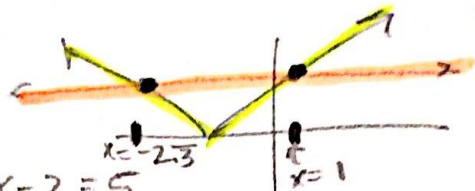
Systems of non-linear inequalities

3. Solve for x: $|3x + 2| \leq 5$

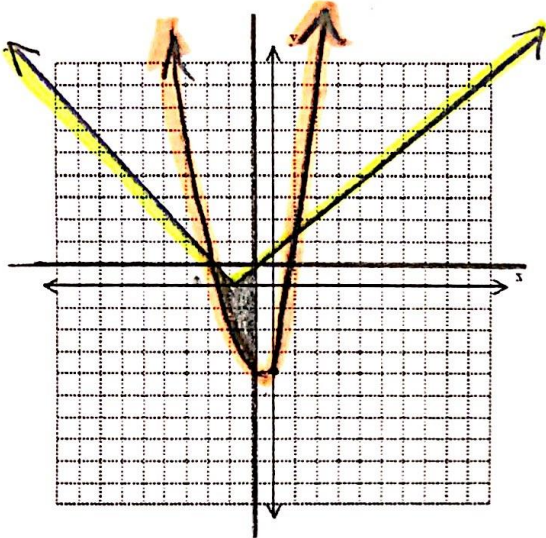
$$3x + 2 = 5 \quad \& \quad -3x - 2 = 5$$

$$3x = 3 \quad \& \quad -3x = 7$$

$$x = 1 \quad \& \quad x = -\frac{7}{3} = -2\frac{2}{3}$$



4. Graph the following system of non-linear inequalities and identify where the feasible region is.



$$\begin{cases} y \leq 1 \\ x \leq -1 \\ y \geq x^2 + x - 4 \\ y \leq |x + 1| \end{cases}$$

5. Solve for x algebraically, show your solution graphically:

ALL ARE DASHED

a. $\begin{cases} (4x + 1)(x - 5) > y \\ y < 3x - 5 \end{cases}$

$$(4x + 1)(x - 5) = 3x - 5$$

$$4x^2 - 20x + x - 5 = 3x - 5$$

$$4x^2 - 22x = 0$$

$$2x(2x - 11) = 0 \quad x = 0 \quad \& \quad x = 5.5$$

b. $\begin{cases} (2x + 1)^2 > y \\ y > 10 - x \end{cases}$

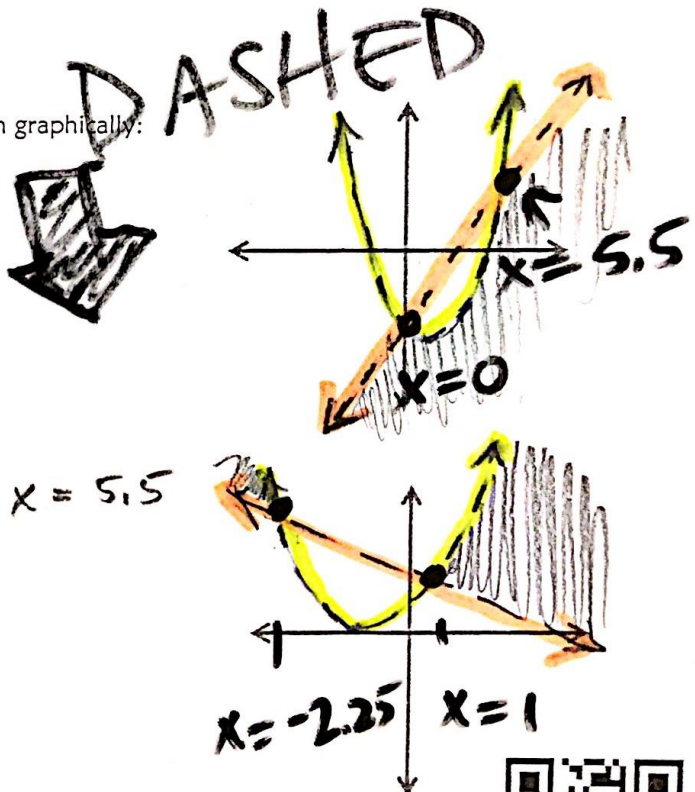
$$(2x + 1)^2 = 10 - x$$

$$(2x + 1)(2x + 1) = 10 - x$$

$$4x^2 + 2x + 2x + 1 = 10 - x$$

$$4x^2 + 5x - 9 = 0$$

$$x = \frac{-5 \pm \sqrt{25 + 144}}{8}$$



<https://goo.gl/vkS3iQ>

$$x = 1$$

$$x = -2.25$$