

1) A local artisan is making red plates and gold plates to sell at the farmer's market. Due to budget and time constraints, she can make no more than 70 plates and spend no more than \$215. The cost for making the plates will be at least \$50 plus \$2 per red plate and \$3 per gold plate.

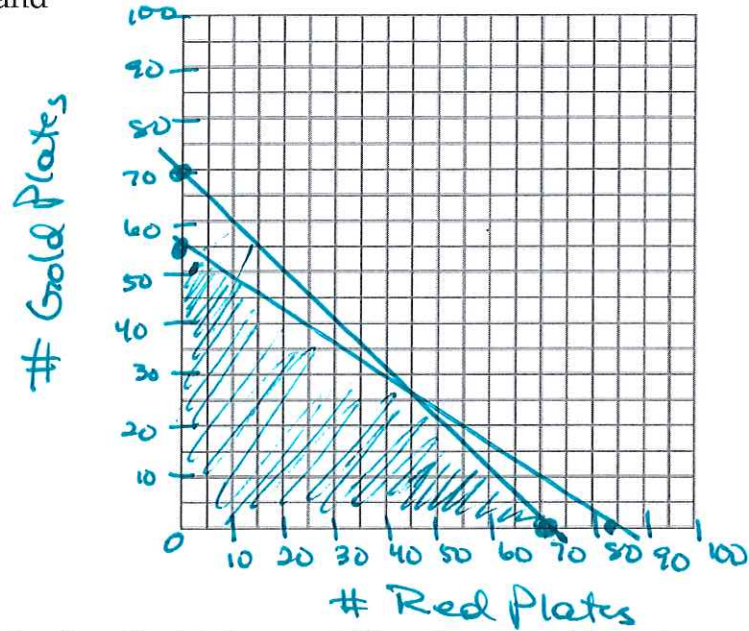
Write and graph a system of inequalities to represent this situation, using  $x$  for the number of red plates and  $y$  for the number of gold plates.

Constraints :

$$\left\{ \begin{array}{l} x \geq 0 \\ y \geq 0 \\ x + y \leq 70 \\ 50 + 2x + 3y \leq 215 \end{array} \right.$$

$$\begin{aligned} 2x + 3y &\leq 165 \\ 2x + 3(0) &= 165 \\ x &= 82.5 \end{aligned}$$

$$\begin{aligned} 2(0) + 3y &= 165 \\ 3y &= 165 \\ y &= 55 \end{aligned}$$



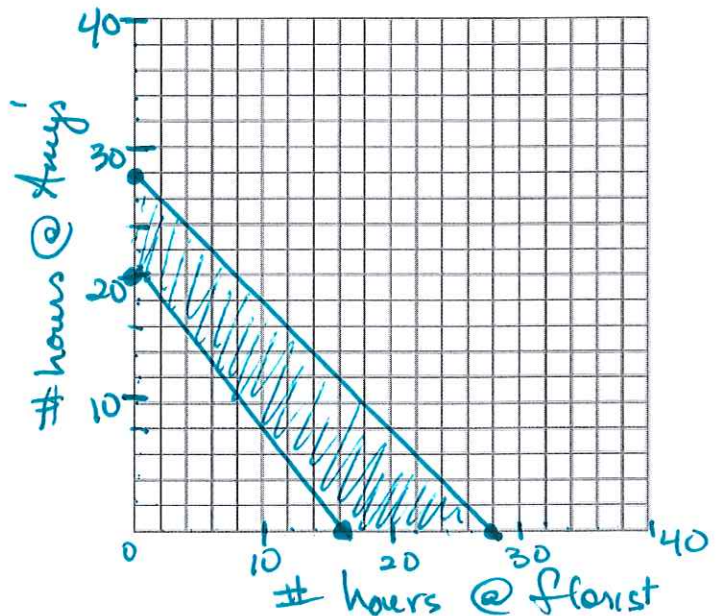
2) Chloe has two jobs. She earns \$10 an hour working in a florist shop and \$8 an hour working at Amy's Ice Cream. She can't work more than 28 hours each week, but she also needs to make at least \$160 each week.

Write and graph a system of inequalities to represent this situation, using  $x$  for hours at the florist &  $y$  for hours at Amy's Ice Cream.

$$\left\{ \begin{array}{l} x \geq 0 \\ y \geq 0 \\ x + y \leq 28 \\ 10x + 8y \geq 160 \end{array} \right.$$

$$\begin{aligned} 10x + 8(0) &= 160 \\ 10x &= 160 \\ x &= 16 \end{aligned}$$

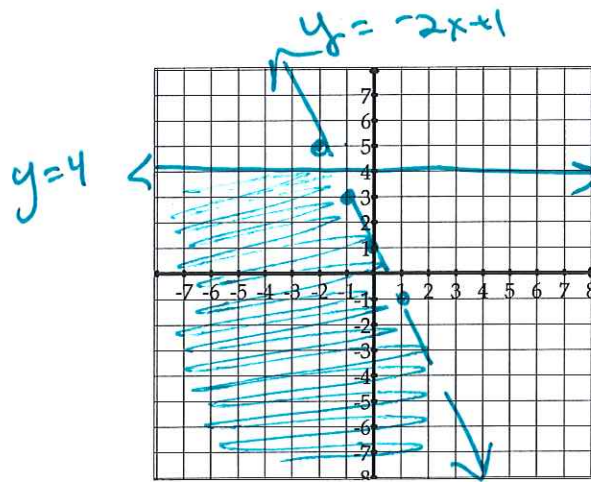
$$\begin{aligned} 10(0) + 8y &= 160 \\ 8y &= 160 \\ y &= 20 \end{aligned}$$



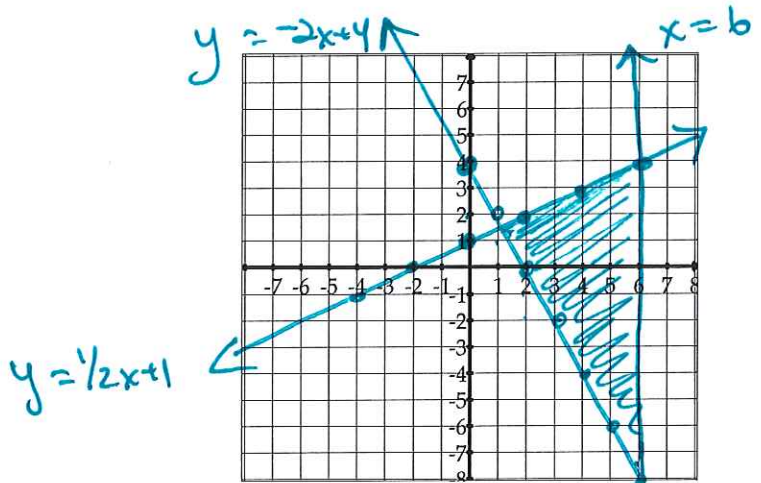
Graph the systems of inequalities:

3) 
$$\begin{cases} y \leq 4 \\ 2x + y < 1 \end{cases}$$

$$y < -2x + 1$$

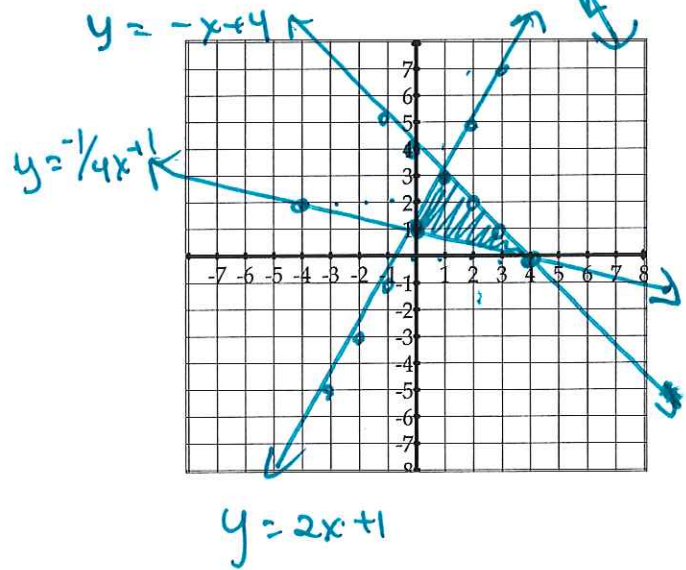


4) 
$$\begin{cases} x \leq 6 \\ y \leq \frac{1}{2}x + 1 \\ y \geq -2x + 4 \end{cases}$$



5) 
$$\begin{cases} 2x - y \geq -1 \\ x + y \leq 4 \\ x + 4y \geq 4 \end{cases}$$

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



### 3.2 Critical Questions:

Why do the solutions to a system of inequalities have to be displayed on a graph?

Because there are multiple solutions that are  $(x, y)$  co-ordinates, so it can't be graphed on a numberline & all solutions can't be listed.