NAME: _____ PERIOD: _____ DATE: _____

Homework Problem Set

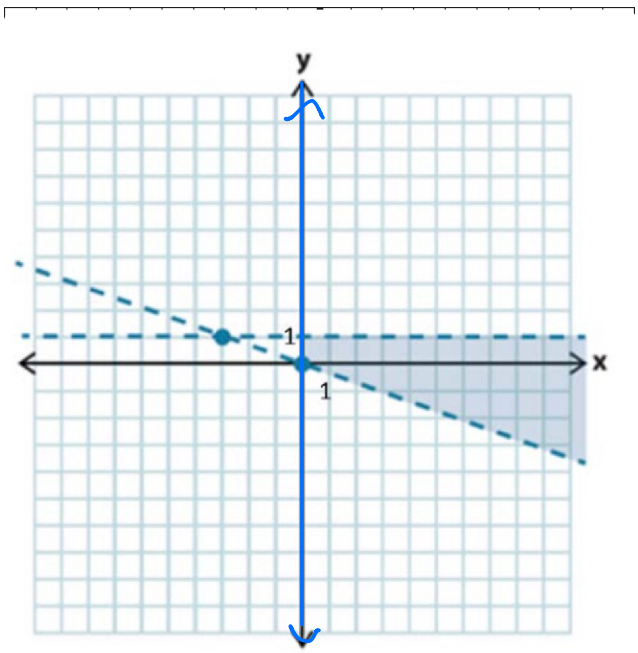
1. Graph the solution to the following system of inequalities:

$$\begin{cases} x \geq 0 \\ y < 2 \\ x + 3y > 0 \end{cases}$$

$x+3y>0$

$3y > x+0$

$y > \frac{1}{3}x$



2. Graph the solution set to the system of inequalities.

$2x - y < 3$ and $4x + 3y \geq 0$

$2x-y<3$

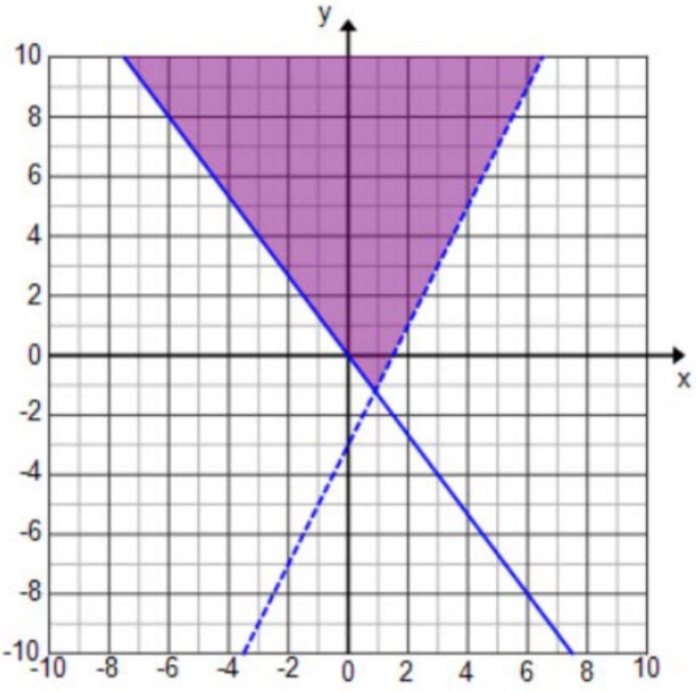
$-y < -2x+3$

$y > 2x-3$

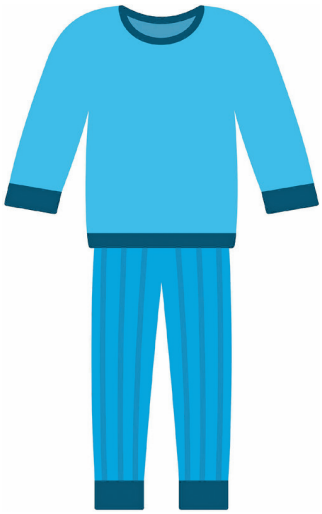
$4x+3y \geq 0$

$3y \geq -4x+0$

$y \geq \frac{-4x}{3}$



3. A clothing manufacturer has 1,000 yds. of cotton to make shirts and pajamas. A shirt requires 1 yd. of fabric, and a pair of pajamas requires 2 yds. of fabric. It takes 2 hr. to make a shirt and 3 hr. to make the pajamas, and there are 1,600 hrs. available to make the clothing.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A. What are the variables?

- # of shirts made
- # of PJs made

B. What are the constraints?

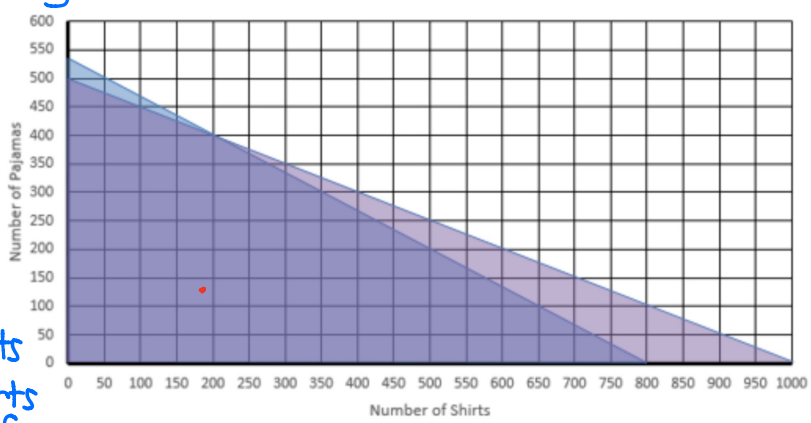
- How much time manufacturer has &
- How much material is available

C. Write inequalities for the constraints.

x = # of shirts
y = # of PJs

$$\begin{cases} x \geq 0 \\ y \geq 0 \\ x + 2y \leq 1000 \\ 2x + 3y \leq 1600 \end{cases}$$

D. Graph the inequalities and shade the solution set.



E. What does the shaded region represent?

The shaded region represents various combinations of shirts and PJs that it would be for manufacturer to make

F. Suppose the manufacturer makes a profit of $10 on shirts and $18 on pajamas. How would it decide how many of each to make?

manufacturer wants to make as many as possible, so the maximum should be at one of the endpoints of the shaded region.

G. How many of each should the manufacturer make, assuming it will sell all the shirts and pajamas it makes?

Profit = 10x + 18y
(0, 500) → $9000 profit

(200, 400) → $9200 profit
(800, 0) → $8000 profit

He should make 200 shirts & 400 pairs of PJs for max profit.

4. A potter is making cups and plates. It takes her 6 mins. to make a cup and 3 mins. to make a plate. Each cup uses $\frac{3}{4}$ lb. clay, and each plate uses 1 lb. of clay. She has 20 hrs. available to make the cups and plates and has 250 lbs. of clay.

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A. What are the variables?

C = # of cups
p = # of plates

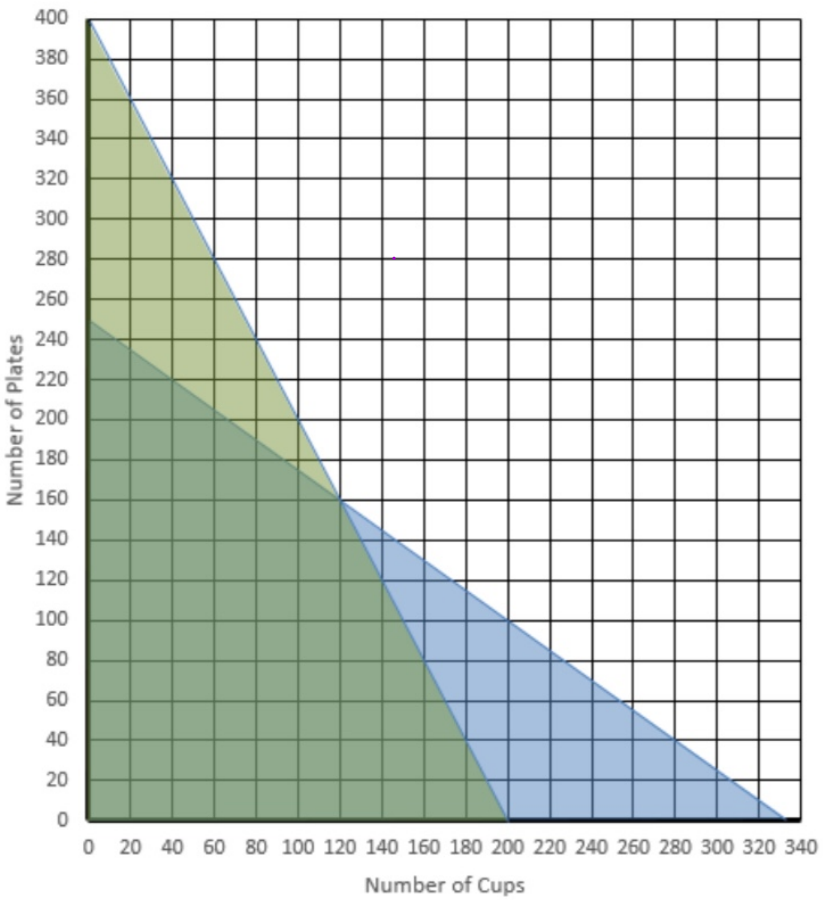
B. Write inequalities for the constraints.

$c \geq 0$
$p \geq 0$

$\frac{3}{4}c + 1p \leq 250$

$\frac{1}{10}c + \frac{1}{20}p \leq 20$ ← need to represent minutes as a fraction of an hour.

C. Graph and shade the solution set.



D. If she makes a profit of \$2 on each cup and \$1.50 on each plate, how many of each should she make in order to maximize her profit?

where do all inequalities intersect { 120 cups, 160 plates

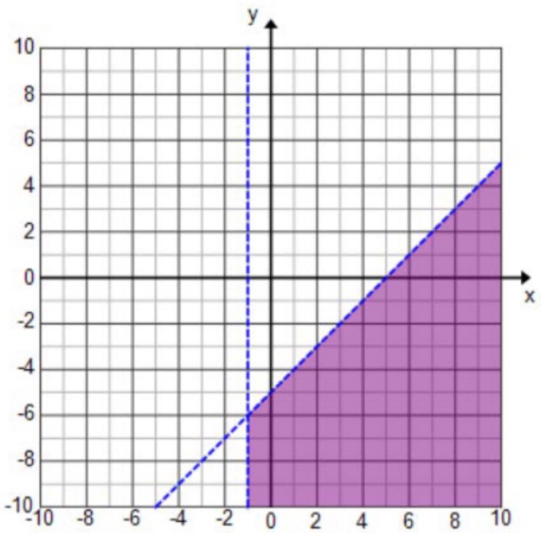
E. What is her maximum profit?

120 cups → 2(120) = \$240
160 plates → 1.5(160) = \$240

\$480 profit

Graph the solution set to each system of inequalities.

5. $\begin{cases} x - y > 5 \\ x > -1 \end{cases}$ → $y < x - 5$



6. $\begin{cases} y \leq x + 4 \\ y \leq 4 - x \\ y \geq 0 \end{cases}$