Lesson #12: Graphing Inequlaities (2.7, 3.4)

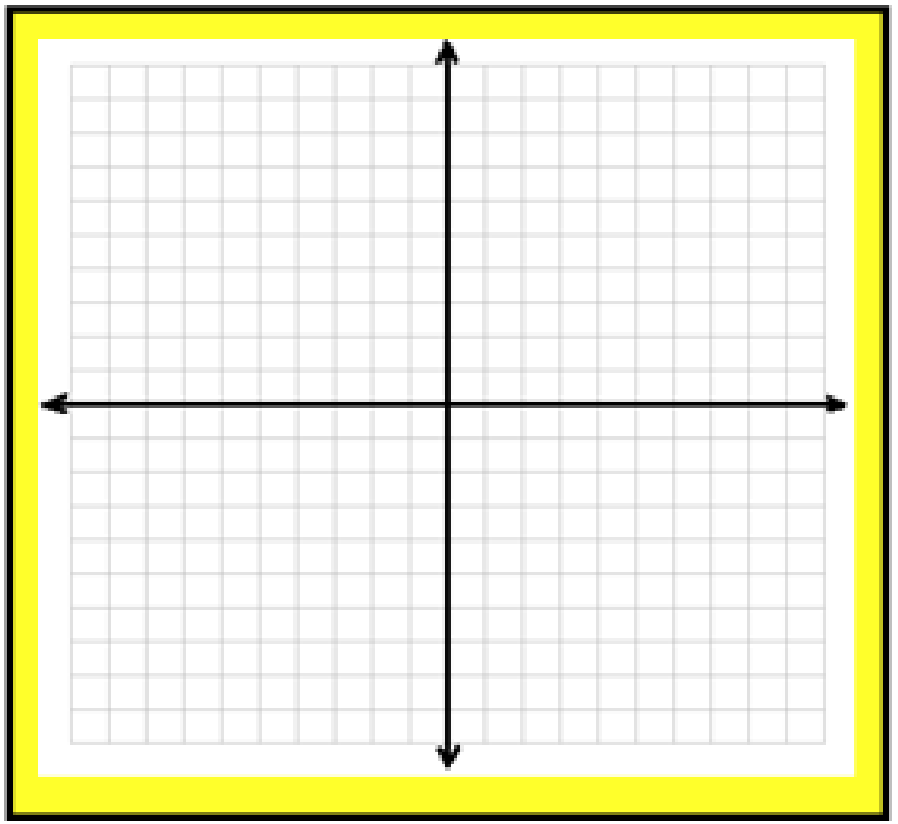
By the end of this lesson you will be able to:

- Graph linear inequalities
- Graph systems of inequalities
- Solve systems of inequalities

Lesson #12: Graphing Inequlaities (2.7, 3.4)

Suppose you have $35 to spend. You have been wanting to purchase some CD's and DVD's. The CD's cost $7 and the DVD's cost $14. Let c = the number of CD's and d = the number of DVD's you can buy.

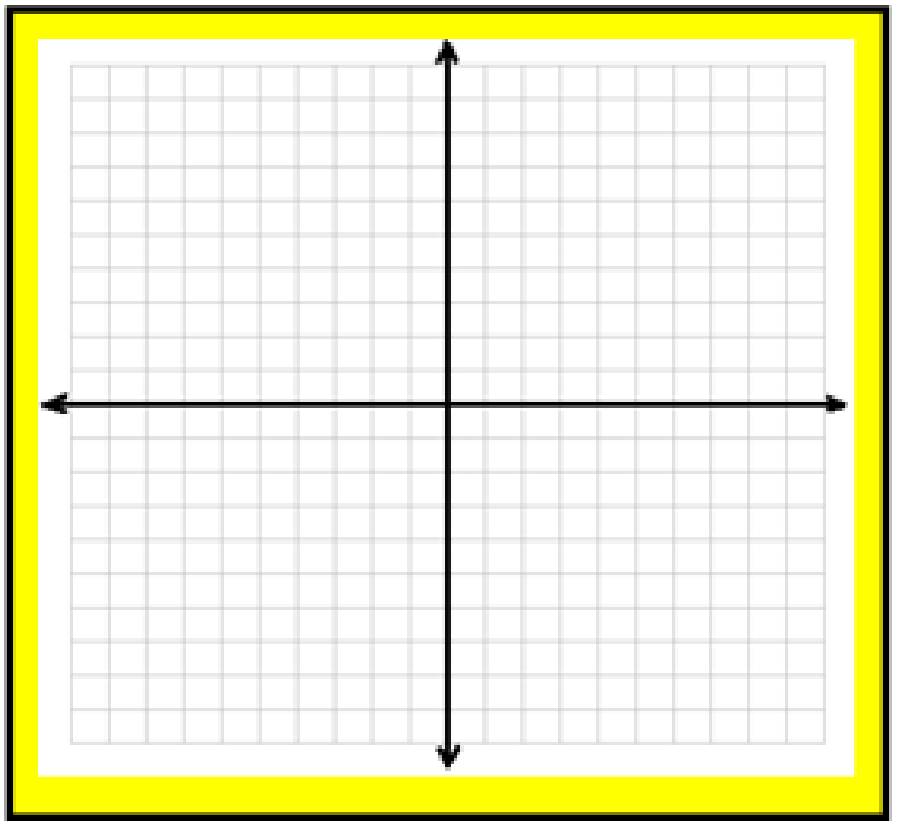
This equation describes the different ways you could spend exaclty $35. ***7c + 14d = 35***



Lesson #12: Graphing Inequlaities (2.7, 3.4)

But what if you wanted some money left over so you could go get ice cream with your friends? We could spend up to $35 on the CD's and DVD's, but we could also have some left over.

This equation describes the different ways you could spend up to $35. $7c + 14d \leq 35$



Lesson #12: Graphing Inequlaities (2.7, 3.4)

When we graph an inequalitiy, we follow these steps:

1. Graph the boundary - Determine whether solid line ($\leq$, $\geq$) or dashed line ($<$, $>$).

2. Test a point in each region.

3. Shade the region whose ordered pair result in a true inequality.

Lesson #12: Graphing Inequalities (2.7, 3.4)

Ex 1: Graph $2y - 3x \leq 3$ Solid

x-int: $(-1, 0)$

$\frac{-3x}{-3} = \frac{3}{-3}$

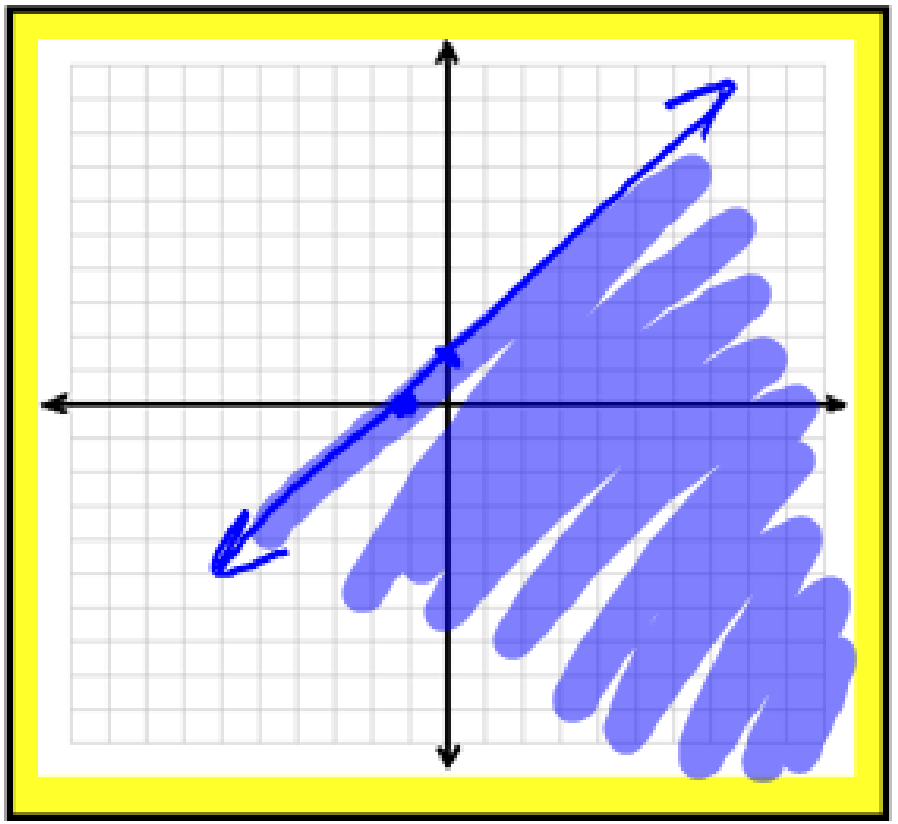
$x = -1$

y-int: $(0, \frac{3}{2})$

Test: $(0,0)$

$2(0) - 3(0) \leq 3$

$0 \leq 3$ ✓



Lesson #12: Graphing Inequalities (2.7, 3.4)

Ex 2: Graph $4x + 3y > 0$

x-int: $(0, 0)$

y-int: $(0, 0)$

pick $x = 1$ $\quad (1, -\frac{4}{3})$

$4(1) + 3y > 0$

$4 + 3y > 0$

$-4 \qquad -4$

$\frac{3y}{3} > \frac{-4}{3}$

$y > \frac{-4}{3}$

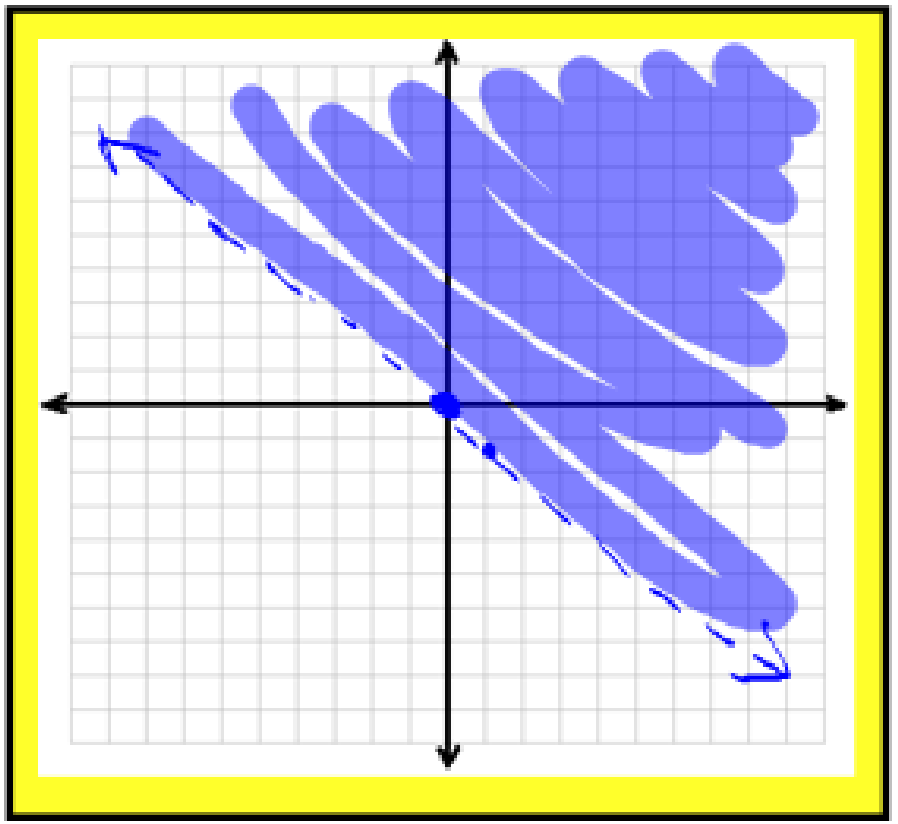
dashed

Test: $(1, 1)$

$4(1) + 3(1) > 0$

$4 + 3 > 0$

$7 > 0$ ✓



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Systems of Inequalities

We can also solve systems of inequalities. Just like solving systems of equations, we will graph the equations, but this time every point in BOTH shaded areas are the solutions for the system.

Lesson #12: Graphing Inequlaities (2.7, 3.4)

Solve the system of inequalities by graphing.

$$x - 2y \geq -2$$

x-int: $(-2, 0)$

y-int: $(0, 1)$

Test: $(0, 0)$

$0 - 0 \geq -2$

$0 \geq -2$ ✓

$$x + y \leq -1$$

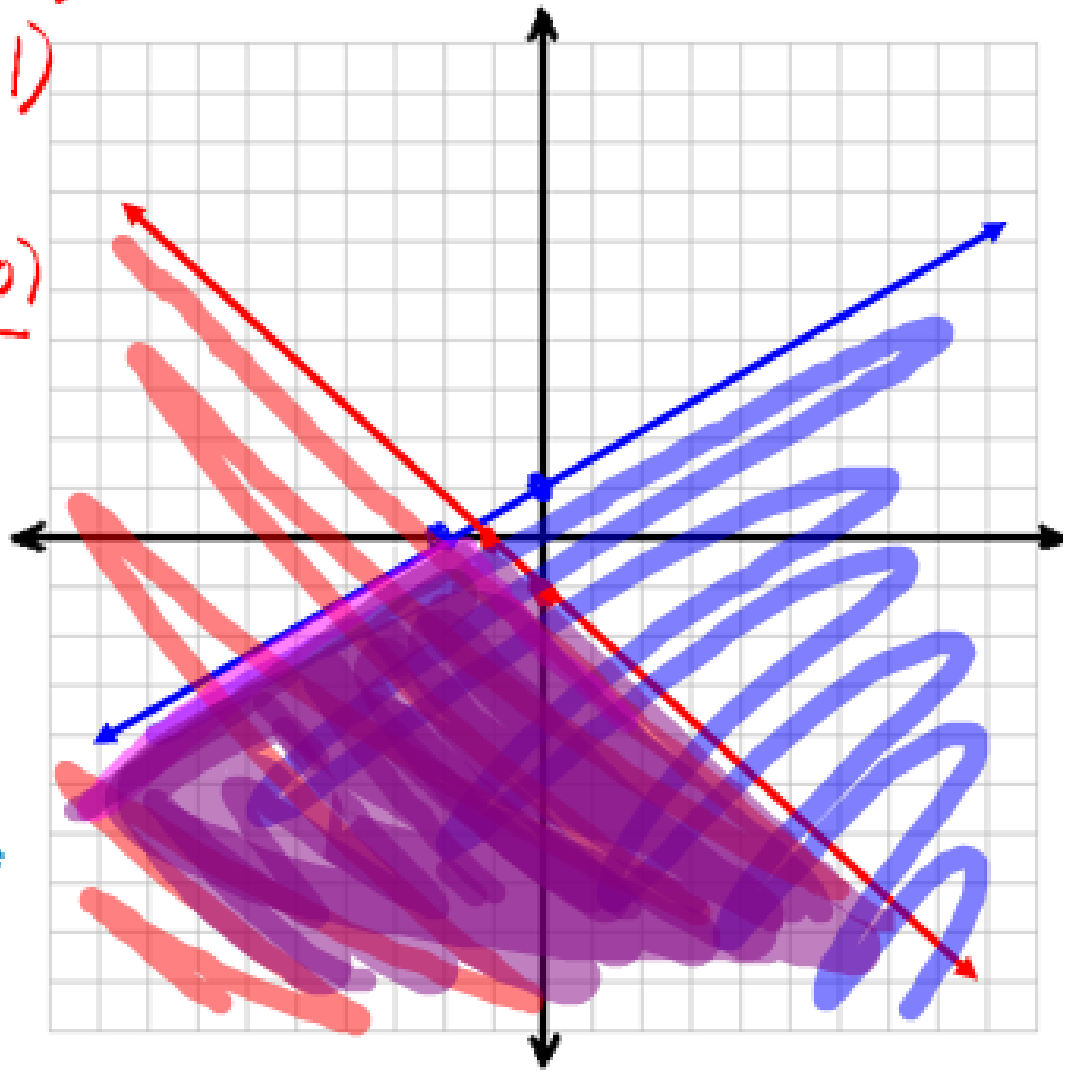
x-int: $(-1, 0)$

y-int: $(0, -1)$

Test: $(0, 0)$

$0 + 0 \leq -1$

$0 \leq -1$ ✗



Any point in the intersection of the 2 graphs is a solution to the system.

Lesson #12: Graphing Inequlaities (2.7, 3.4)

Solve the system of inequalities by graphing.

$$y > \frac{2}{3}x + 2 \qquad y < \frac{2}{3}x - 1$$

Test: (0,0)

$0 > 0 + 2$

$0 > 2$

✗

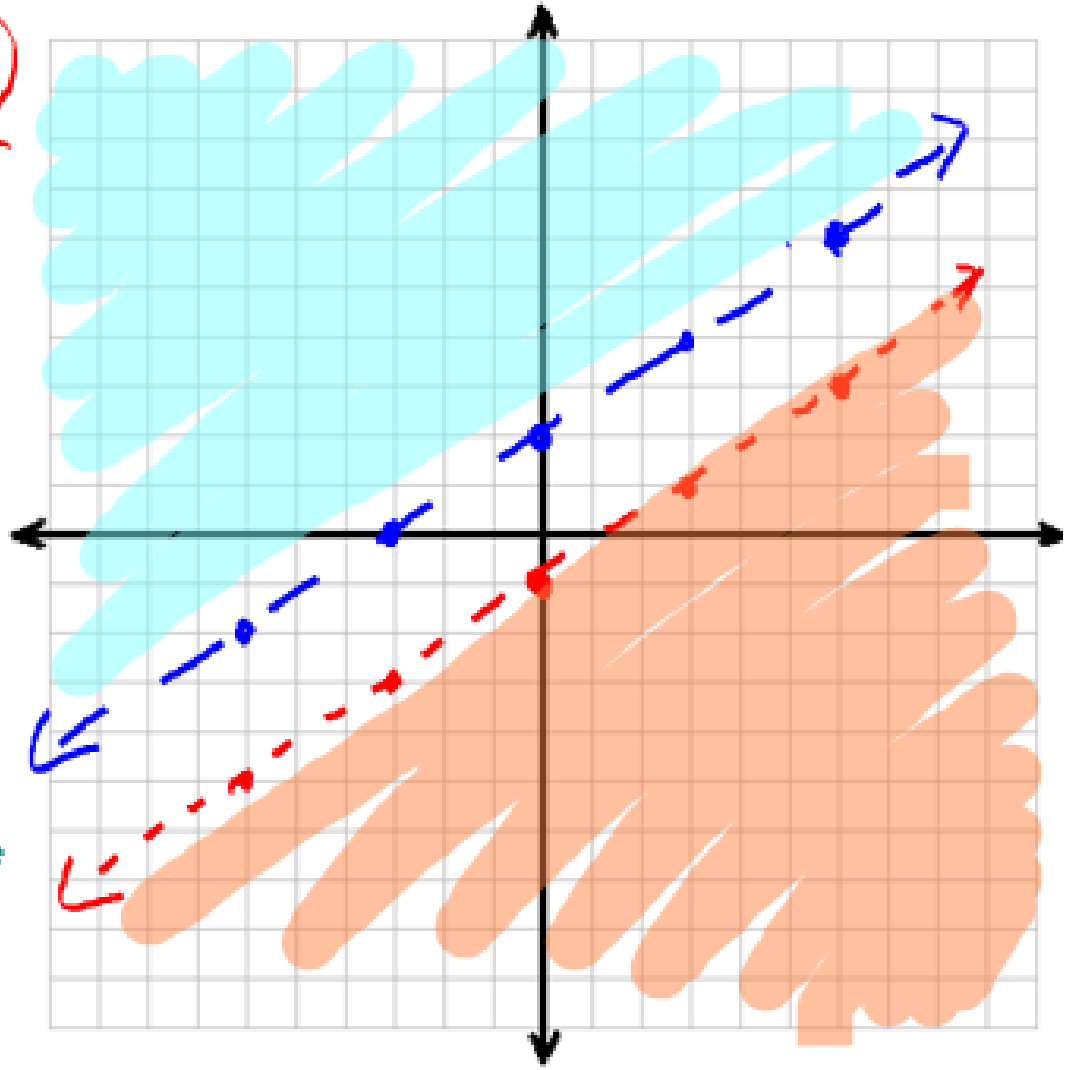
Test (0,0)

$0 < 0 - 1$

$0 < -1$

✗

No Solution



Any point in the intersection of the 2 graphs is a solution to the system.

Lesson #12: Graphing Inequlaities (2.7, 3.4)

Solve the system of inequalities by graphing.

$y \geq \frac{2}{3}x + 4$

Test: (0,0)

$0 \geq 0 + 4$

$0 \geq 4$ ✗

$y \geq x - 2$

Test: (0,0)

$0 \geq 0 - 2$

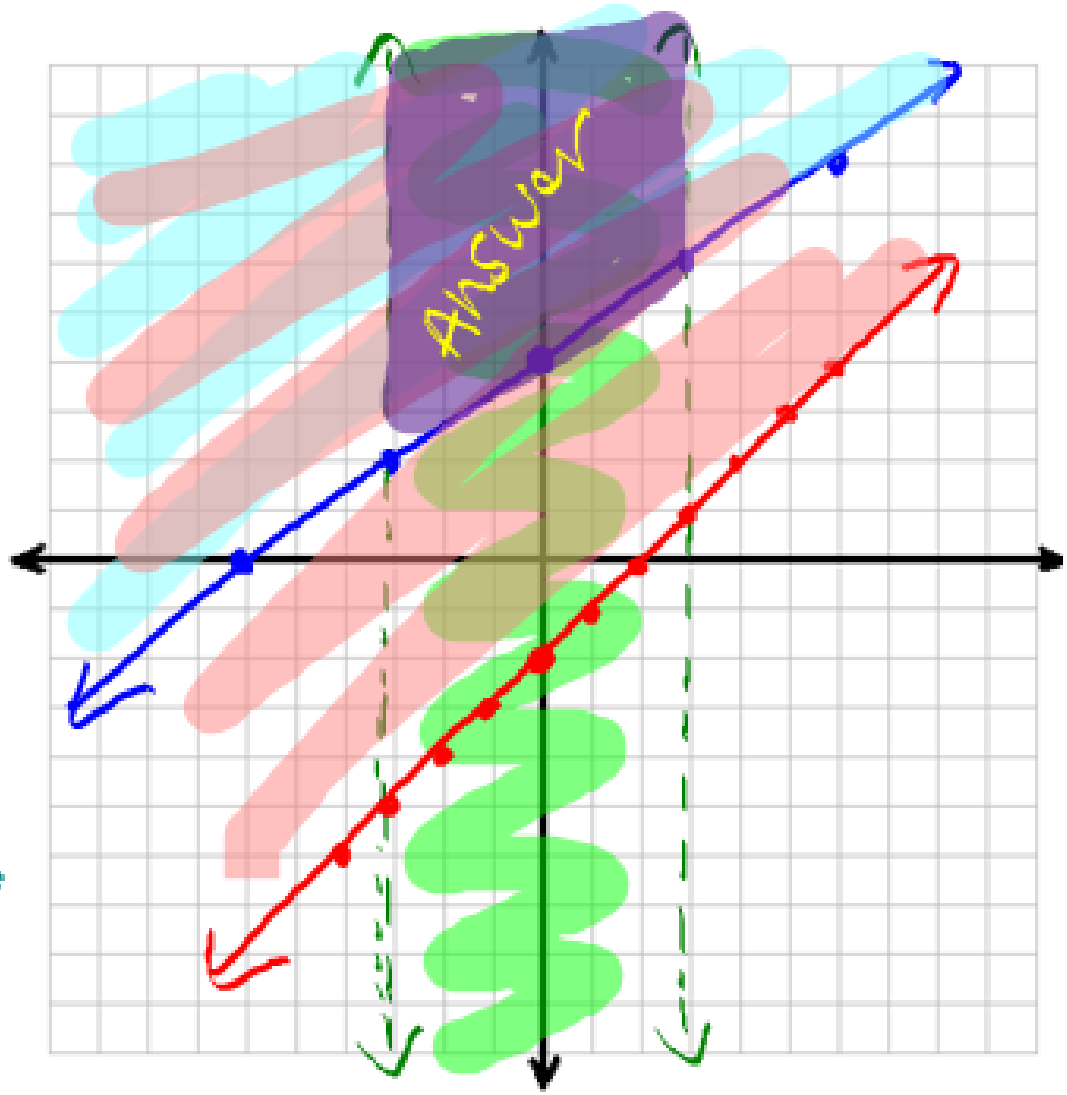
$0 \geq -2$ ✓

$|x| < 3$

$x < 3$ $x > -3$

Any point in the intersection of the graphs is a solution to the system.

Note: | x | < 3 can be rewritten as x > -3 and x < 3



Lesson #12: Graphing Inequlaities (2.7, 3.4)

Solve the system of inequalities by graphing.

$x \geq 5$ $\quad$ $x + y \leq 3$

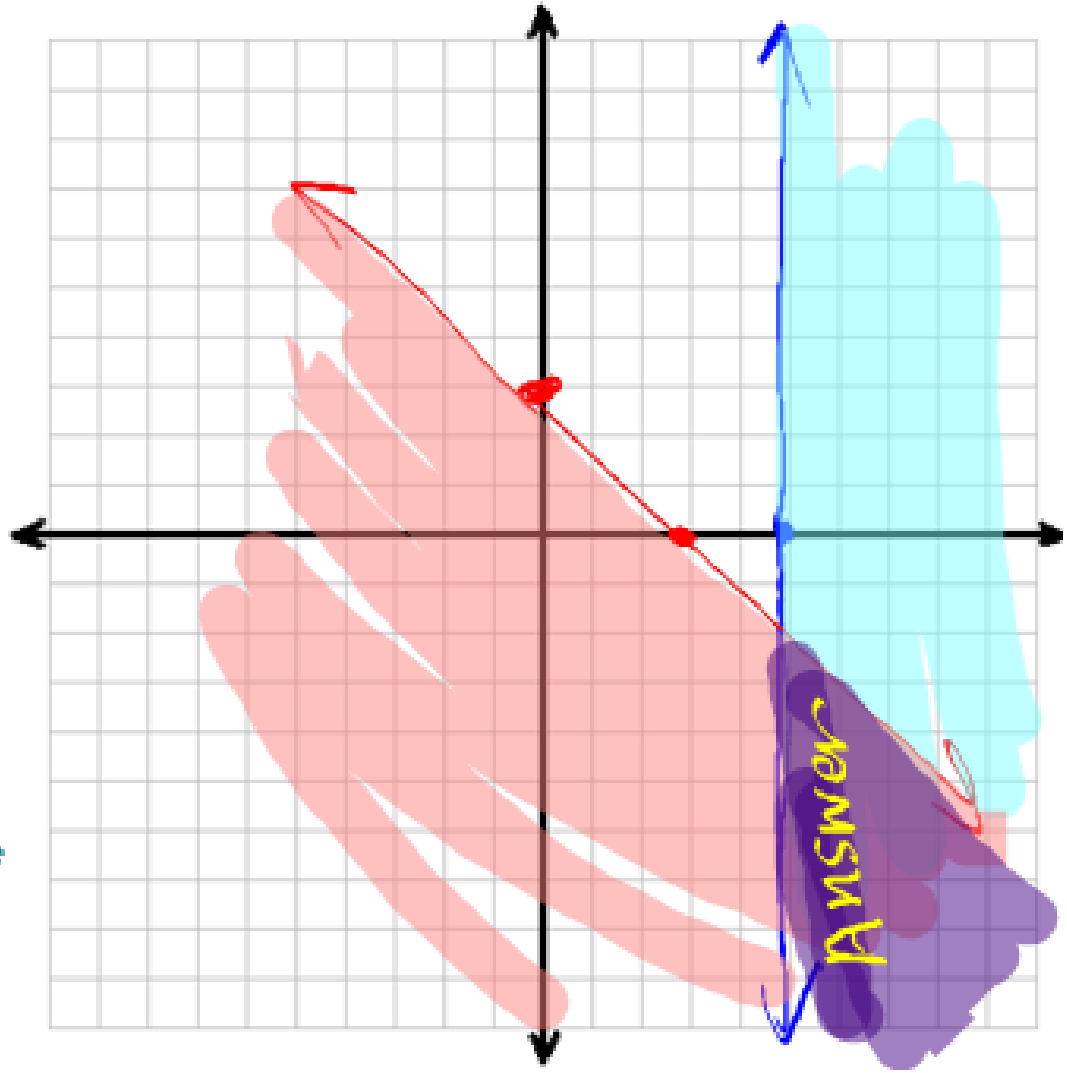
x-int: (3,0)

y-int: (0,3)

Test: (0,0)

$0 + 0 \leq 3$

$0 \leq 3$ ✓



Any point in the intersection of the 2 graphs is a solution to the system.

Lesson #12: Graphing Inequlaities (2.7, 3.4)

Solve the system of inequalities by graphing.

$$y > -\frac{4}{5}x - 4 \qquad y > -\frac{4}{5}x + 2$$

Test: (0,0)

$0 > 0 - 4$

$0 > -4$

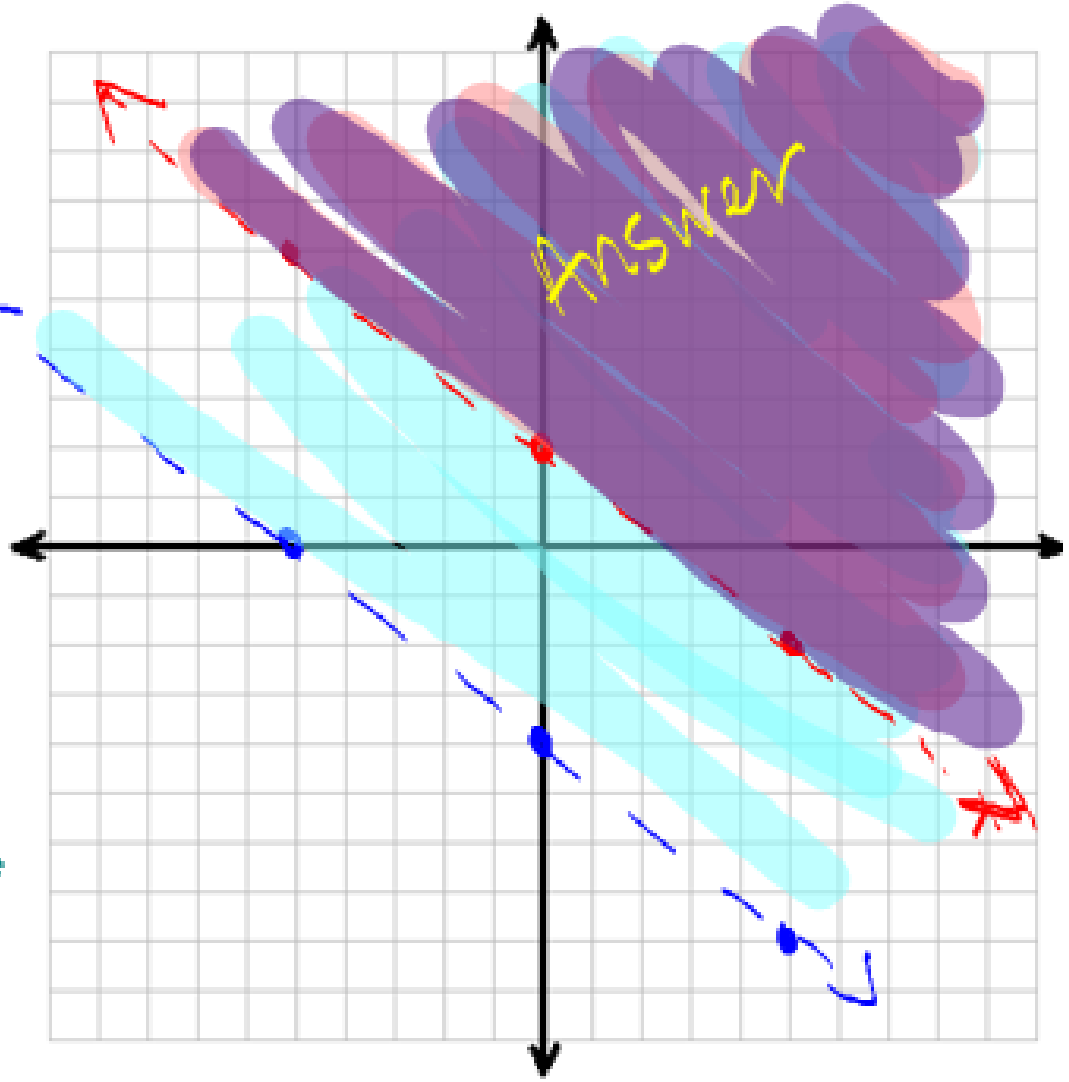
✓

Test: (0,0)

$0 > 0 + 2$

$0 > 2$

✗



Any point in the intersection of the 2 graphs is a solution to the system.

Lesson #12: Graphing Inequlaities (2.7, 3.4)

Solve the system of inequalities by graphing.

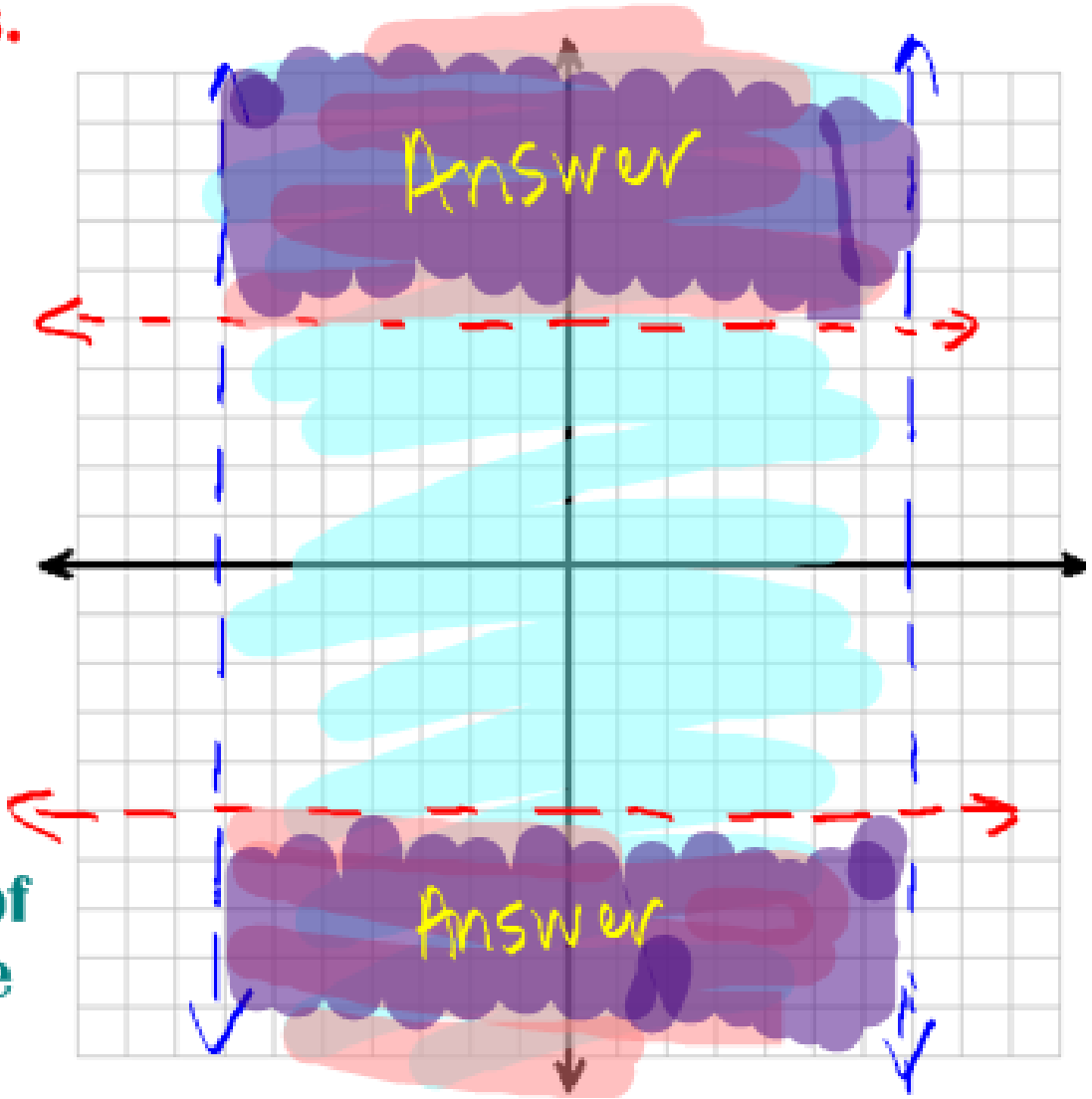
$|x| < 7$

$|y| > 5$

Note: Absolute values can be written as 2 inequalities.

$x < 7 \quad x > -7$

$y > 5 \quad y < -5$



Any point in the intersection of the graphs is a solution to the system.

Lesson #12: Graphing Inequlaities (2.7, 3.4)

By the end of this lesson you will be able to:

- **Graph linear inequalities**
- **Graph systems of inequalities**
- **Solve systems of inequalities**

Can you?

Assignment #12

Due at the beginning of class