

# Graphing Systems of Inequalities

**Bell Work:**

- 1. What type is this linear function?  $3x + 4y = -12$**
- 2. What is a point of the linear function above?**
- 3. Graph the equation?**
- 4. What is the domain for the absolute value parent function?**

# Graphing Systems of Inequalities

**Graph**  $4x + 3y \leq 16$  and  $4x + 3y > -9$ .

- Graph both lines.*
- Pick a point in each region: to the left, in the middle, and to the right.*  
*to the left:  $(-12, 0)$*   
*in the middle:  $(0, 0)$*   
*to the right:  $(12, 0)$*
- Substitute each point to find if it's true for both inequalities.*

**$(-12, 0)$**

$$4(-12) + 3(0) \leq 16$$

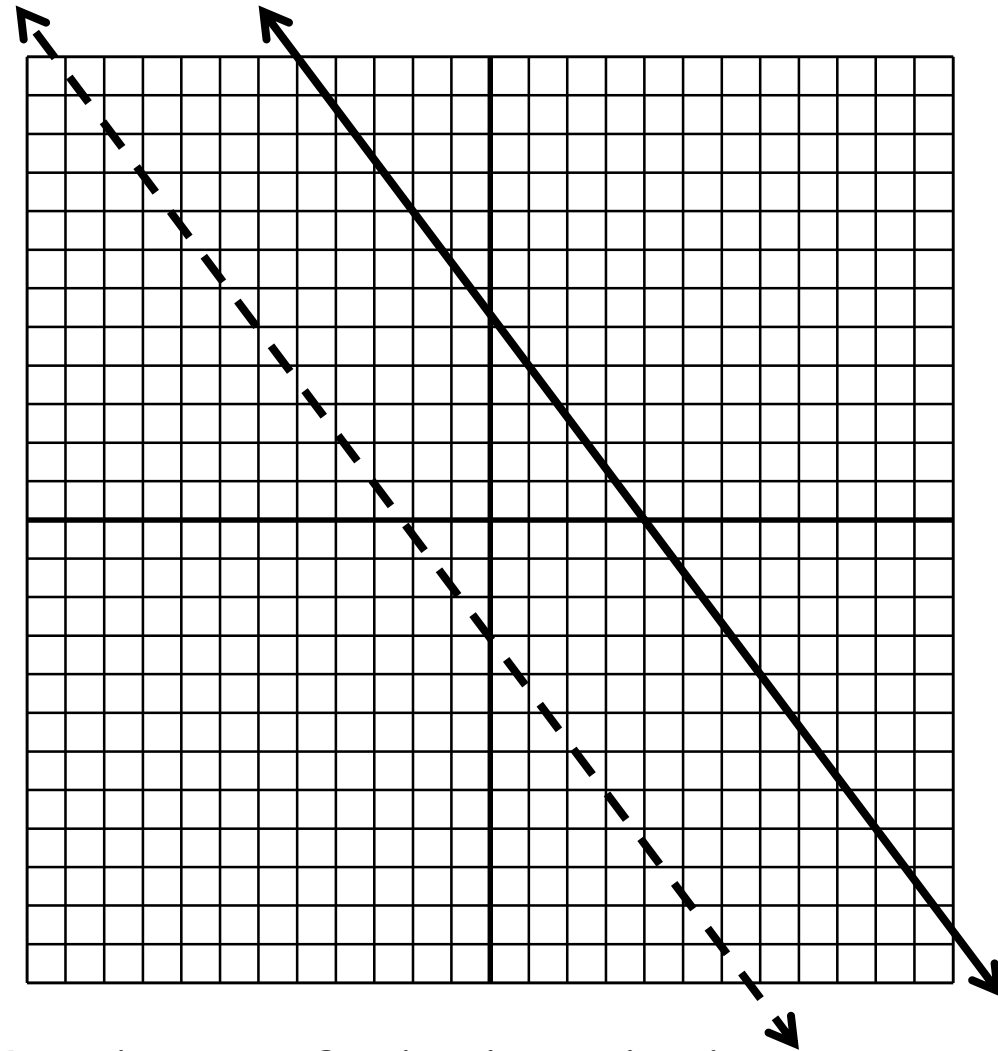
$$-48 \leq 16$$

*True*

$$4(-12) + 3(0) > -9$$

$$-48 > -9$$

*False*



*Must be true for both to shade.  
Don't shade to the left.*

# Graphing Systems of Inequalities

**Graph**  $4x + 3y \leq 16$  and  $4x + 3y > -9$ .

- Graph both lines.*
- Pick a point in each region: to the left, in the middle, and to the right.*  
*to the left:  $(-12, 0)$*   
*in the middle:  $(0, 0)$*   
*to the right:  $(12, 0)$*
- Substitute each point to find if it's true for both inequalities.*

**$(0, 0)$**

$$4(0) + 3(0) \leq 16$$

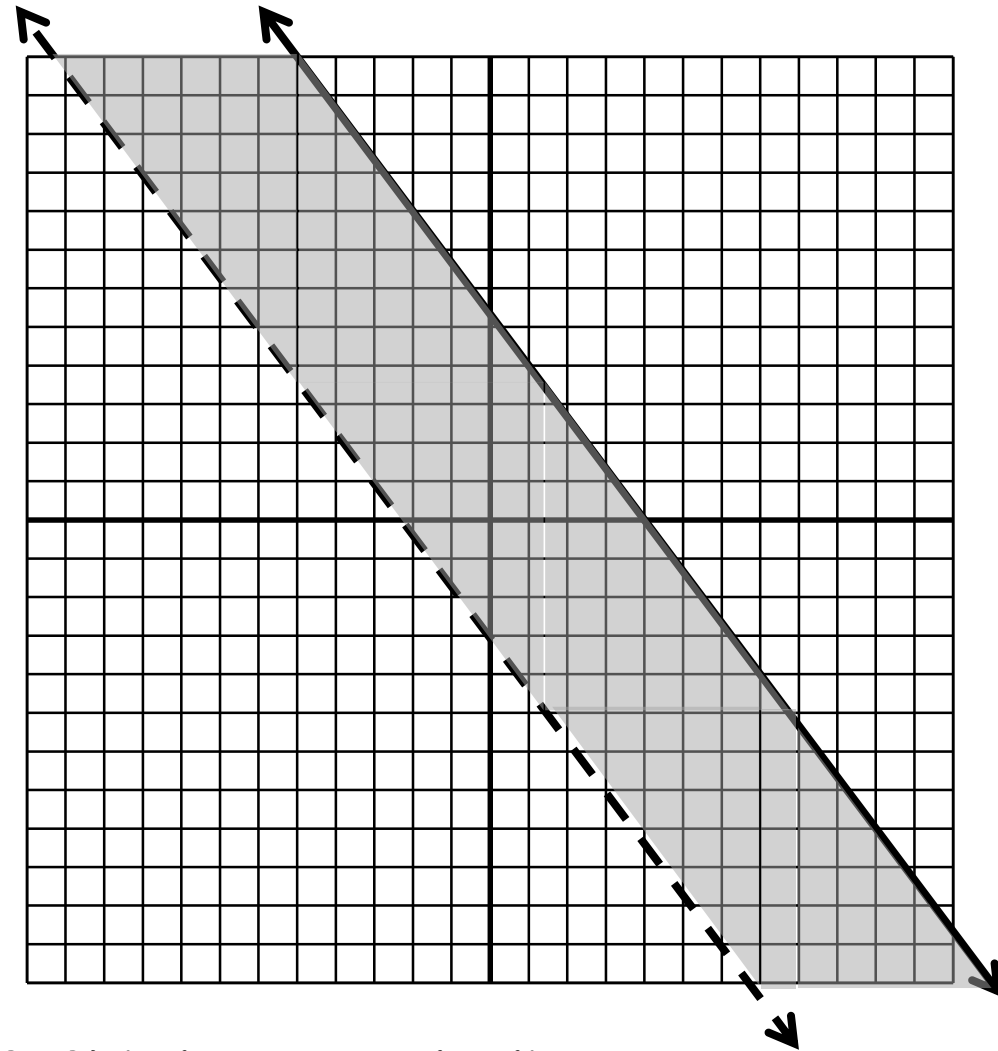
$$0 \leq 16$$

*True*

$$4(0) + 3(0) > -9$$

$$0 > -9$$

*True*



*$(0, 0)$  is between the lines, so shade between the lines.*

# Graphing Systems of Inequalities

**Graph**  $y \leq \frac{2}{3}x + 5$  and  $y < \frac{2}{3}x - 4$ .

- Graph both lines.*
- Pick a point in each region: to the left, in the middle, and to the right.*  
*to the left: (-12, 0)*  
*in the middle: (0, 0)*  
*to the right: (12, 0)*
- Substitute each point to find if it's true for both inequalities.*

**(-12, 0)**

$$0 \leq \frac{2}{3}(-12) + 5$$

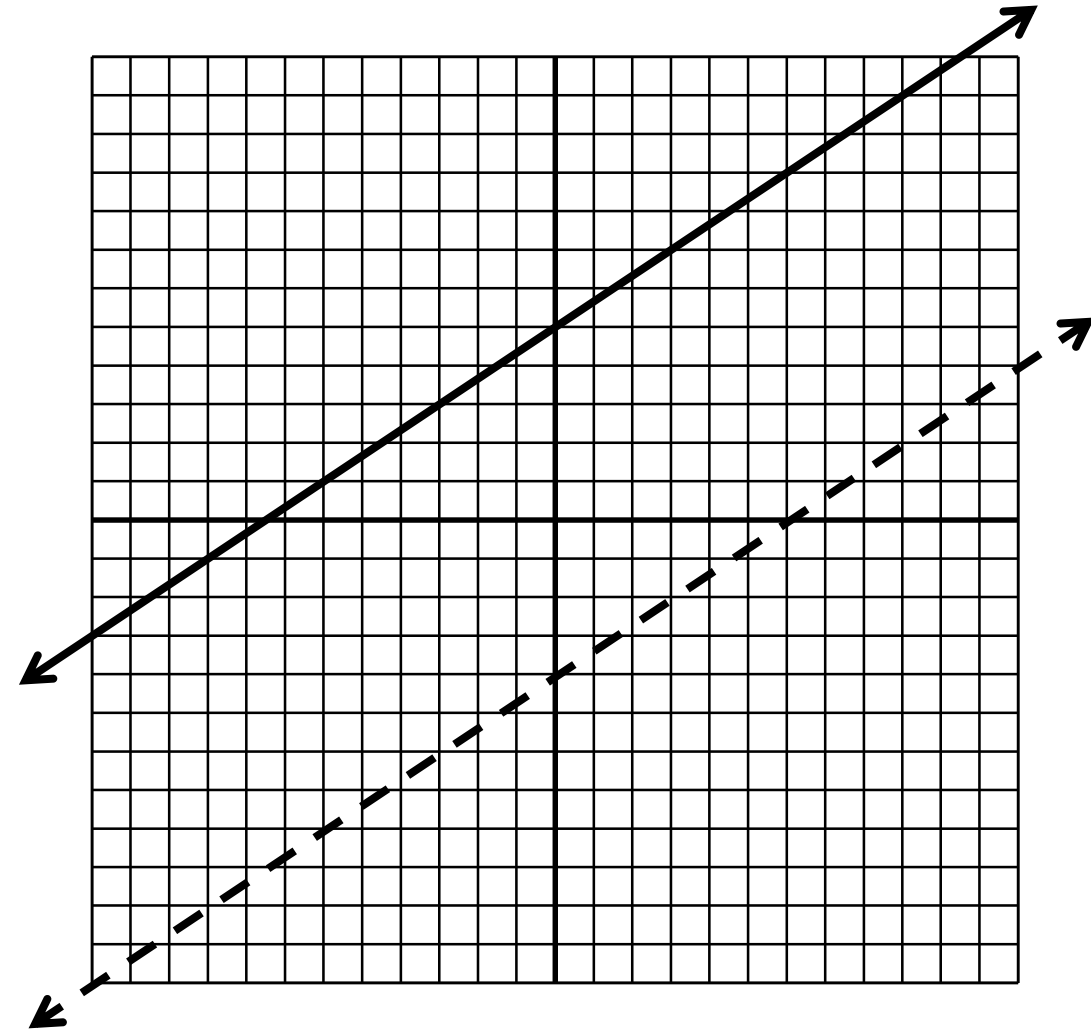
$$0 \leq -3$$

*False*

$$0 < \frac{2}{3}(-12) - 4$$

$$0 < -12$$

*False*



*Must be true for both to shade.*  
*Don't shade to the left.*

# Graphing Systems of Inequalities

**Graph**  $y \leq \frac{2}{3}x + 5$  and  $y < \frac{2}{3}x - 4$ .

1. *Graph both lines.*
2. *Pick a point in each region: to the left, in the middle, and to the right.*  
*to the left: (-12, 0)*  
*in the middle: (0, 0)*  
*to the right: (12, 0)*
3. *Substitute each point to find if it's true for both inequalities.*

**(0, 0)**

$$0 \leq \frac{2}{3}(0) + 5$$

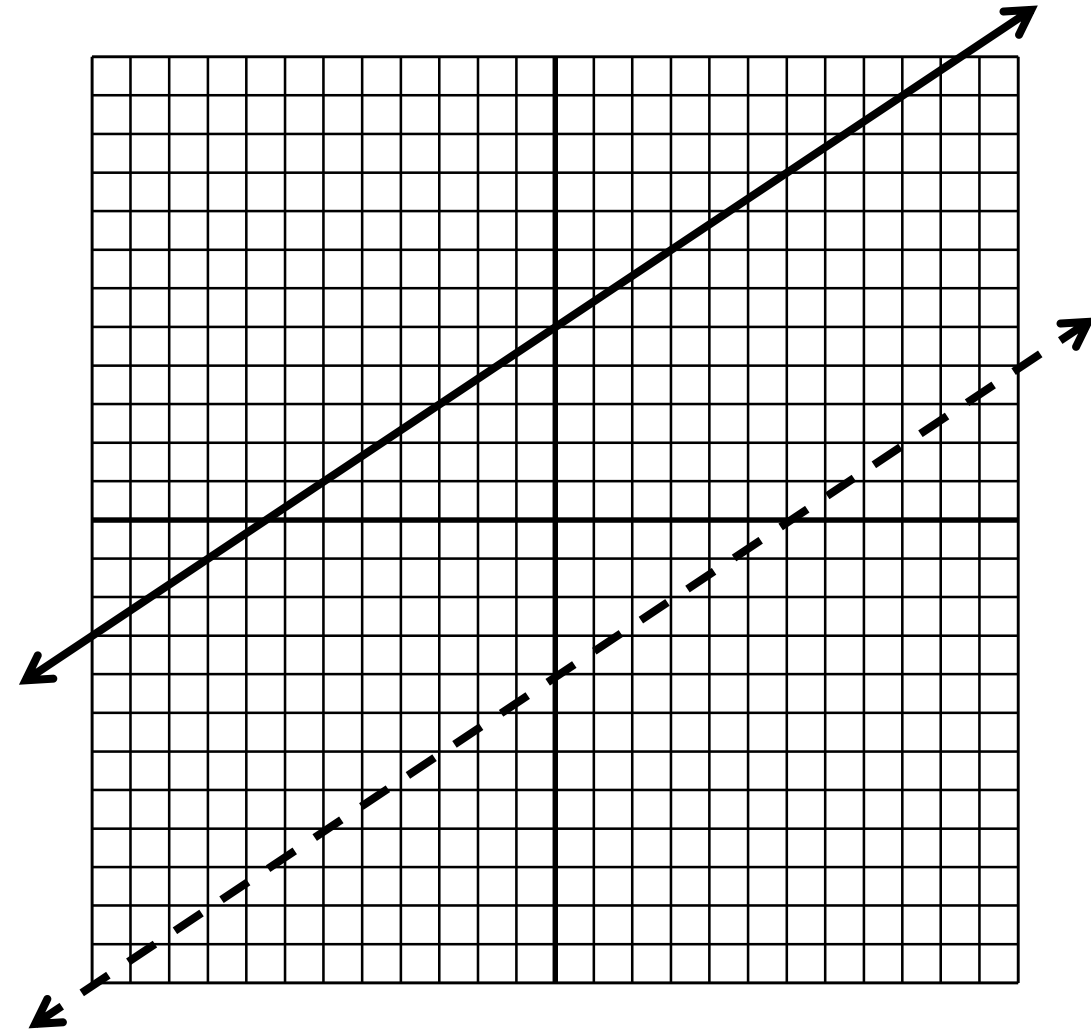
$$0 \leq 5$$

*True*

$$0 < \frac{2}{3}(0) - 4$$

$$0 < -4$$

*False*



*Must be true for both to shade.*  
*Don't shade in the middle.*

# Graphing Systems of Inequalities

**Graph**  $y \leq \frac{2}{3}x + 5$  and  $y < \frac{2}{3}x - 4$ .

1. *Graph both lines.*
2. *Pick a point in each region: to the left, in the middle, and to the right.*

*to the left: (-12, 0)*

*in the middle: (0, 0)*

*to the right: (12, 0)*

3. *Substitute each point to find if it's true for both inequalities.*

**(12, 0)**

$$0 \leq \frac{2}{3}(12) + 5$$

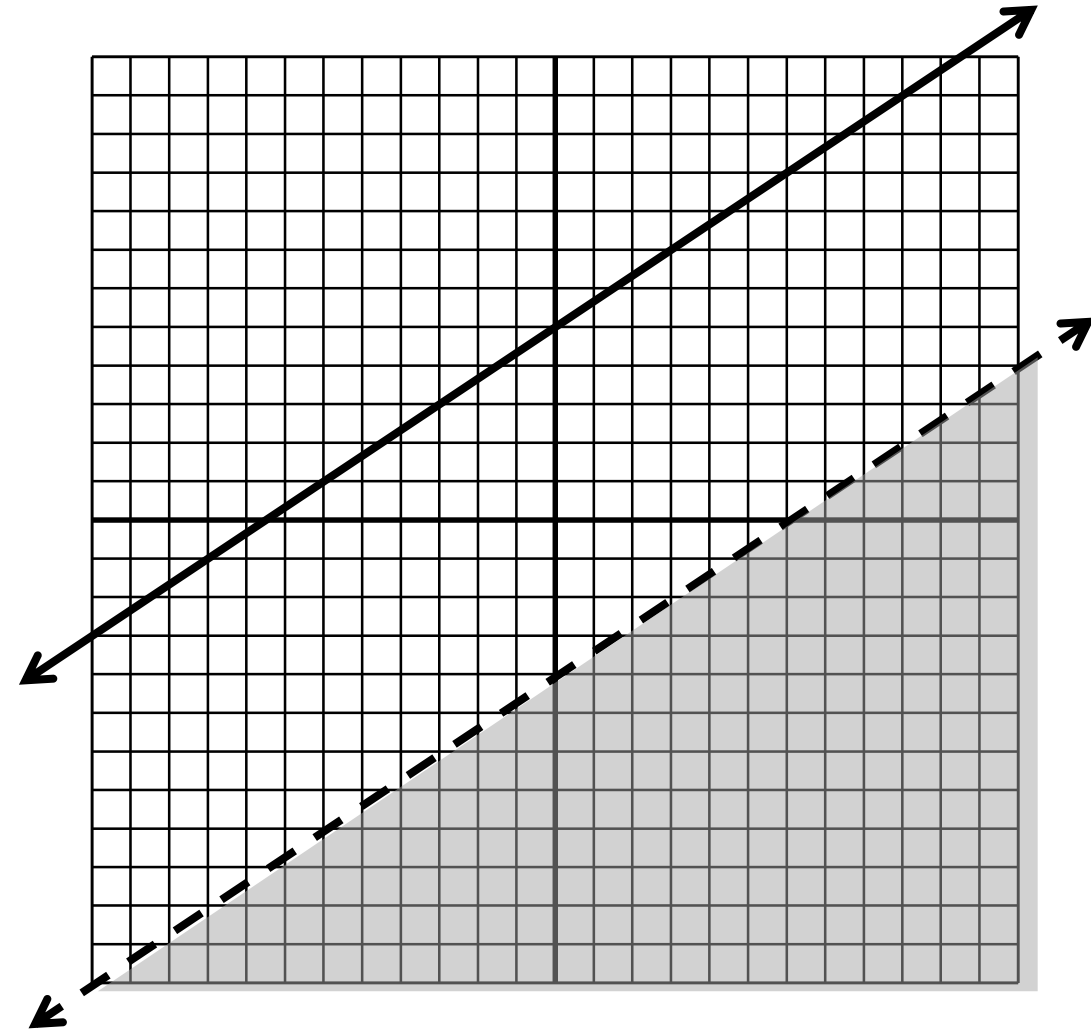
$$0 \leq 13$$

*True*

$$0 < \frac{2}{3}(12) - 4$$

$$0 < 4$$

*True*

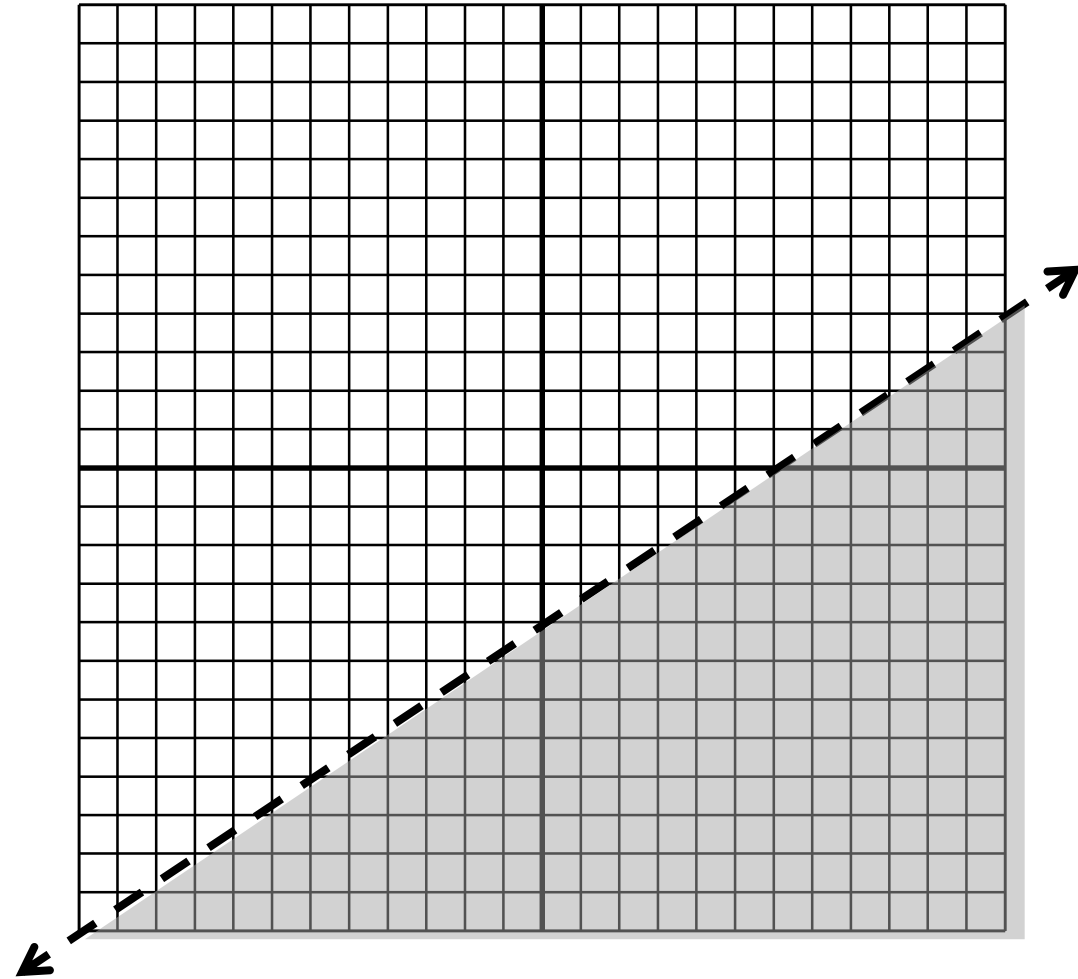


*Both are true, so shade to the right.*

# Graphing Systems of Inequalities

**Graph  $y \leq \frac{2}{3}x + 5$  and  $y < \frac{2}{3}x - 4$ .**

- 1. Graph both lines.*
- 2. Pick a point in each region: to the left, in the middle, and to the right.*  
*to the left:  $(-12, 0)$*   
*in the middle:  $(0, 0)$*   
*to the right:  $(12, 0)$*
- 3. Substitute each point to find if it's true for both inequalities.*
- 4. Erase any solid line that is NOT touching the shaded region.*



# Graphing Systems of Inequalities

Graph  $x - 2y > 12$  and  $x - 2y < -10$ .

1. Graph both lines.

2. Pick a point in each region: above, in the middle, and below.

above:  $(-12, 0)$

in the middle:  $(0, 0)$

below:  $(12, -1)$

*We can't use  $(12, 0)$   
because it is on a line.*

3. Substitute each point to find if it's true for both inequalities.

$(-12, 0)$

$$-12 - 2(0) > 12$$

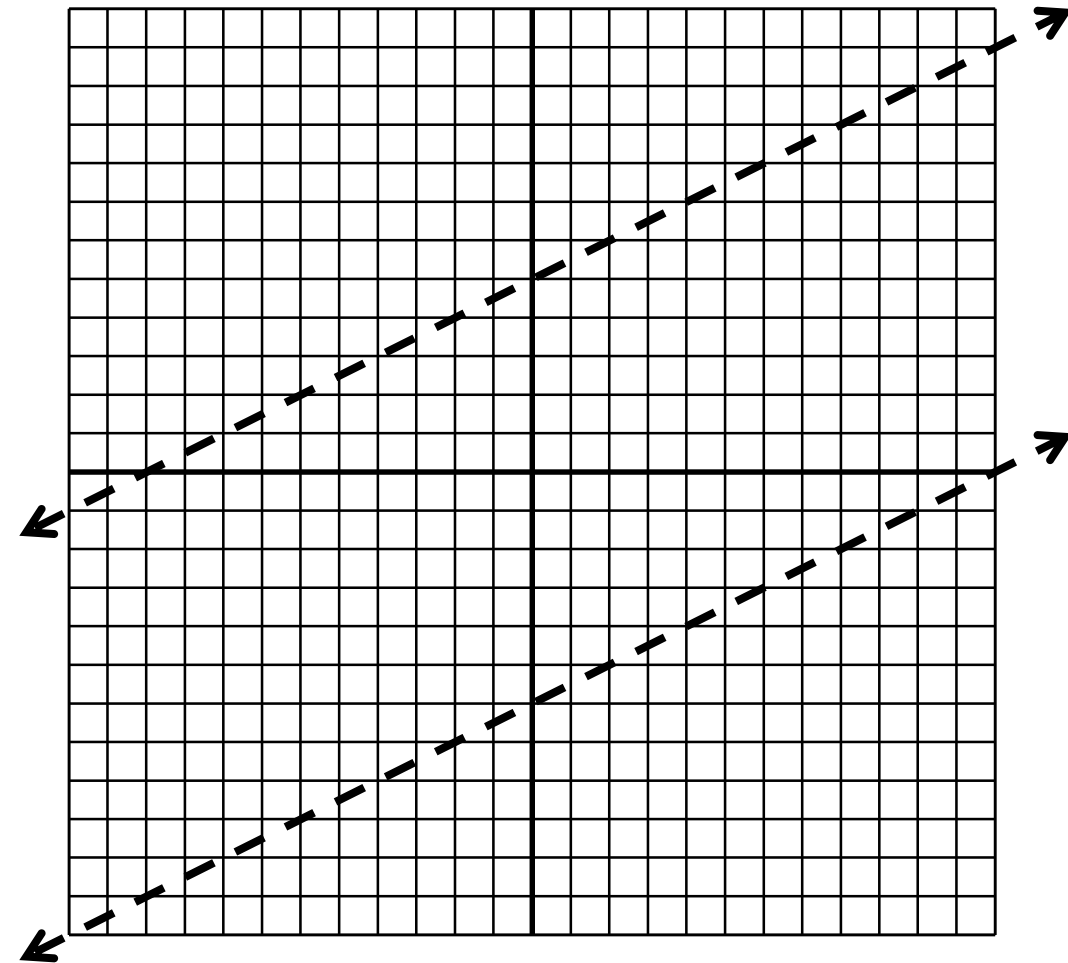
$$-12 > 12$$

*False*

$$-12 - 2(0) < -10$$

$$-12 < -10$$

*True*



*Must be true for both to shade.  
Don't shade above.*



# Graphing Systems of Inequalities

Graph  $x - 2y > 12$  and  $x - 2y < -10$ .

1. Graph both lines.
2. Pick a point in each region: above, in the middle, and below.  
above:  $(-12, 0)$   
in the middle:  $(0, 0)$   
below:  $(12, -1)$
3. Substitute each point to find if it's true for both inequalities.

$(0, 0)$

$$0 - 2(0) > 12$$

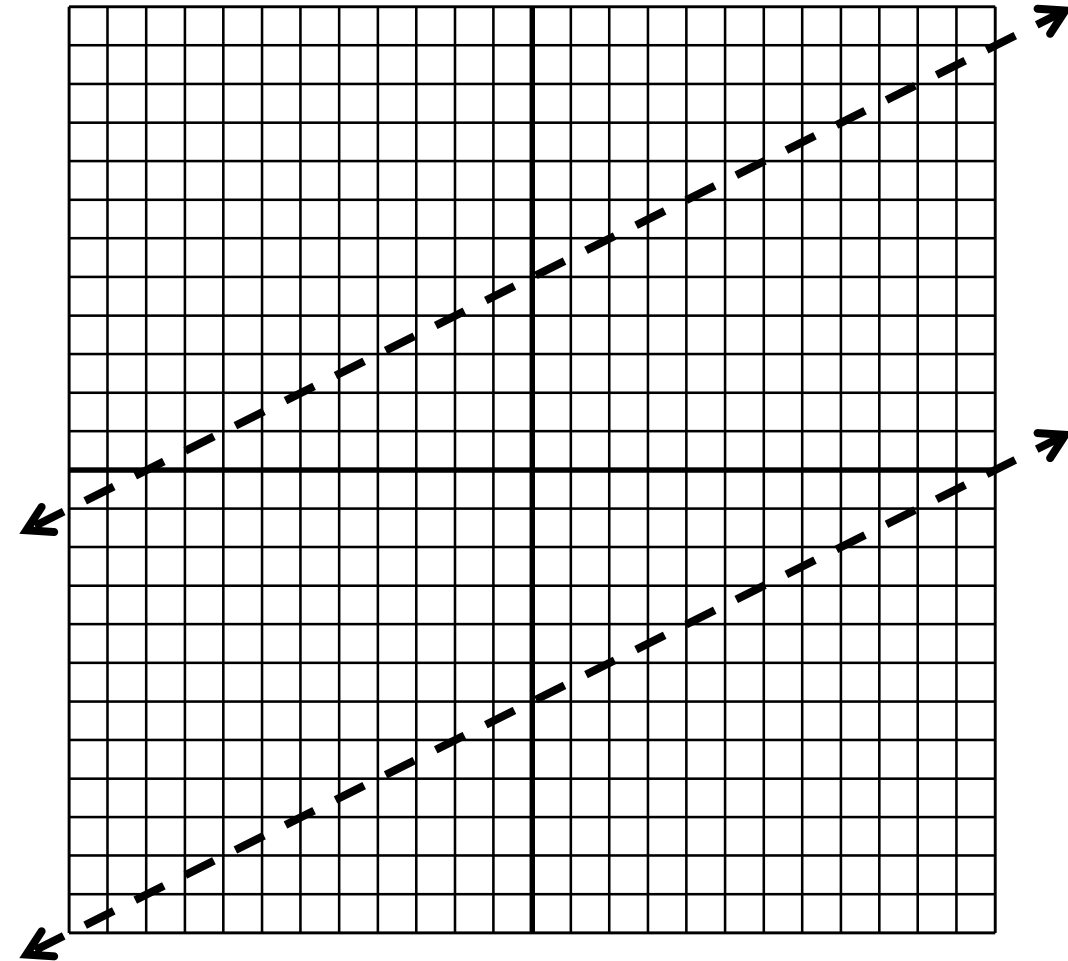
$$0 > 12$$

*False*

$$0 - 2(0) < -10$$

$$0 < -10$$

*True*



*Must be true for both to shade.  
Don't shade above.*

# Graphing Systems of Inequalities

Graph  $x - 2y > 12$  and  $x - 2y < -10$ .

1. Graph both lines.
2. Pick a point in each region: above, in the middle, and below.  
above:  $(-12, 0)$   
in the middle:  $(0, 0)$   
below:  $(12, -1)$
3. Substitute each point to find if it's true for both inequalities.

$(-12, -1)$

$$12 - 2(-1) > 12$$

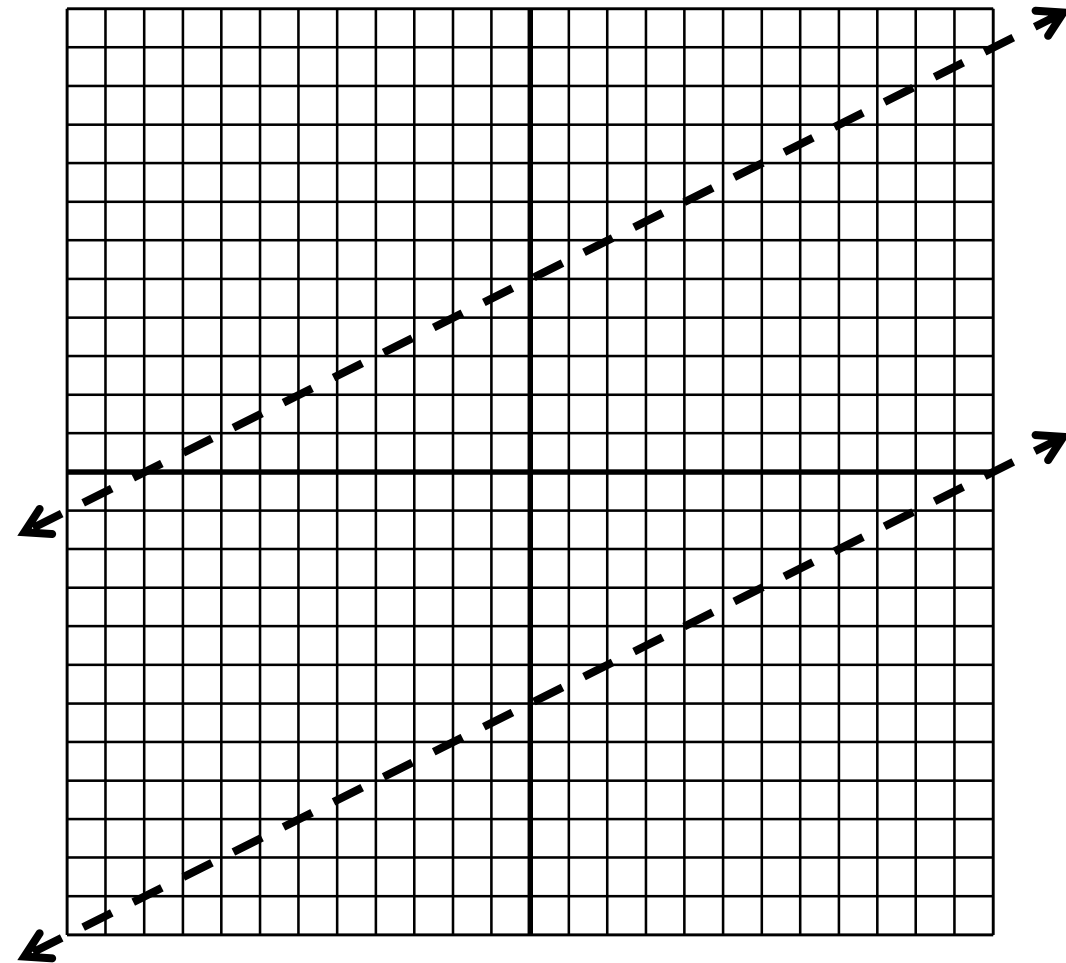
$$14 > 12$$

*True*

$$12 - 2(-1) < -10$$

$$14 < -10$$

*False*



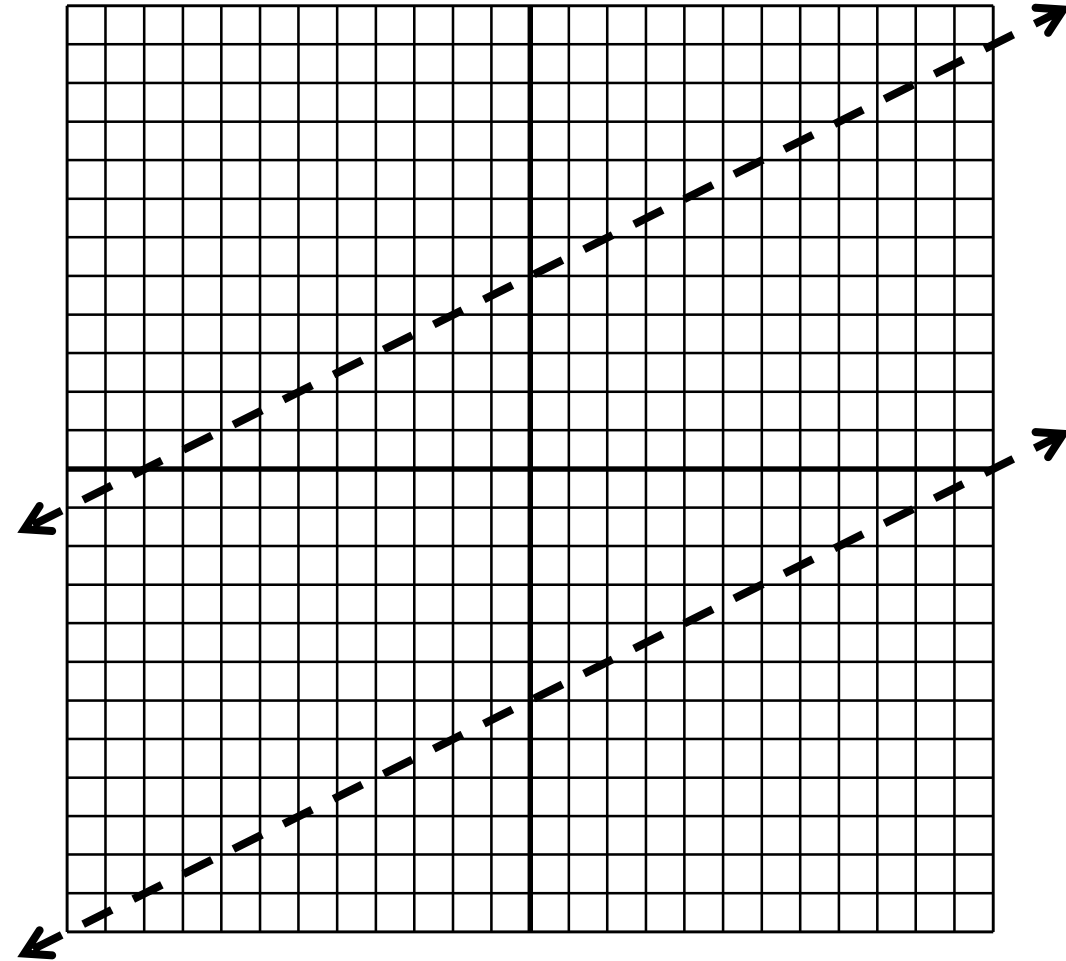
*Must be true for both to shade.  
Don't shade in the middle.*

# Graphing Systems of Inequalities

**Graph  $x - 2y > 12$  and  $x - 2y < -10$ .**

- Graph both lines.*
- Pick a point in each region: above, in the middle, and below.*  
*above:  $(-12, 0)$*   
*in the middle:  $(0, 0)$*   
*below:  $(12, -1)$*
- Substitute each point to find if it's true for both inequalities.*

*None of the regions are true for both, so there are no solutions.*



# Graphing Systems of Inequalities

**Graph**  $y \leq -\frac{3}{2}x + 2$  and  $y < -\frac{3}{2}x - 7$ .

1. *Graph both lines.*
2. *Pick a point in each region: to the left, in the middle, and to the right.*  
*to the left: (-12, 0)*  
*in the middle: (0, 0)*  
*to the right: (12, 0)*
3. *Substitute each point to find if it's true for both inequalities.*

**(-12, 0)**

$$0 \leq -\frac{3}{2}(-12) + 2$$

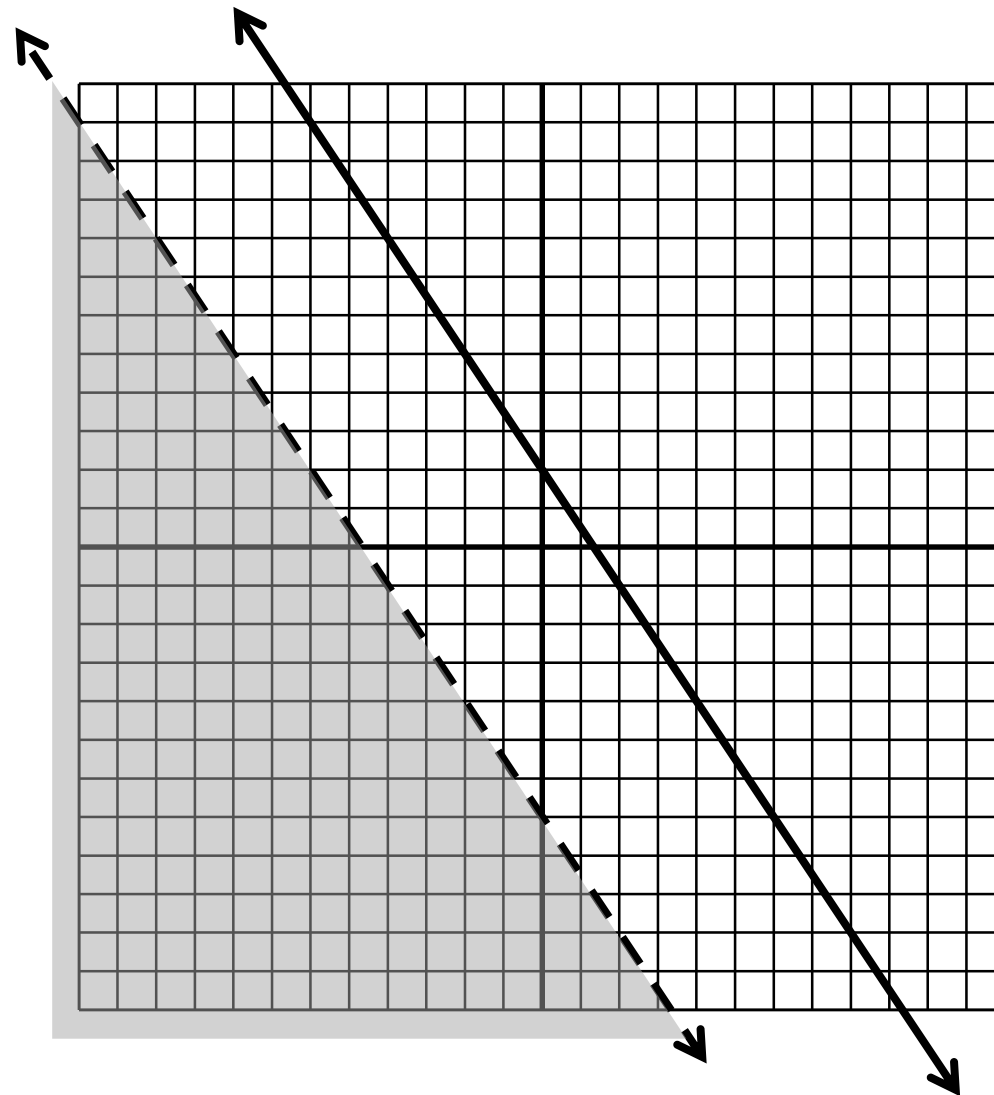
$$0 \leq 20$$

*True*

$$0 < -\frac{3}{2}(-12) - 4$$

$$0 < 14$$

*True*

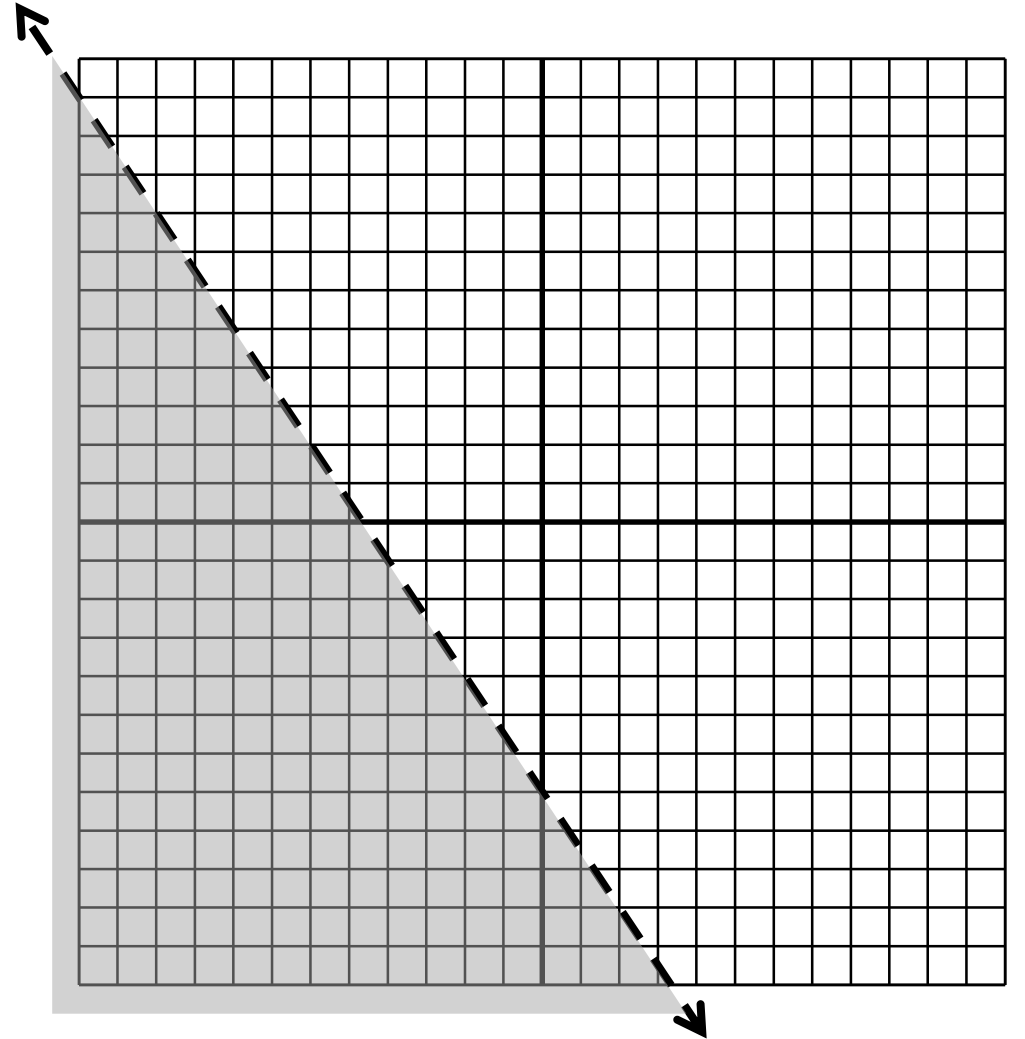


*It's true for both so shade to the left.*

# Graphing Systems of Inequalities

**Graph**  $y \leq -\frac{3}{2}x + 2$  and  $y < -\frac{3}{2}x - 7$ .

1. *Graph both lines.*
2. *Pick a point in each region: to the left, in the middle, and to the right.*  
*to the left:  $(-12, 0)$*   
*in the middle:  $(0, 0)$*   
*to the right:  $(12, 0)$*
3. *Substitute each point to find if it's true for both inequalities.*
4. *Erase any solid line that is NOT touching the shaded region.*



# Graphing Systems of Inequalities

**Assignment:**

**FLUENCY PRACTICE: Graphing Systems of Parallel  
Linear Inequalities Worksheet**