

7.5 - Linear Inequalities

Vocabulary

Inequality $>$ $<$ \geq \leq

Linear Inequality

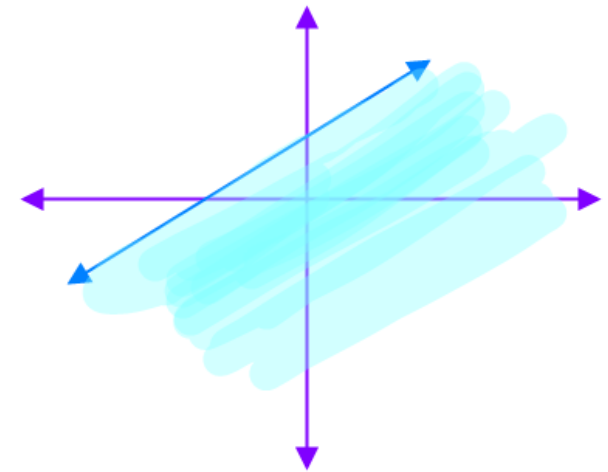
Solution of an inequality

$$x \leq -4$$



describes a region on the coordinate plane

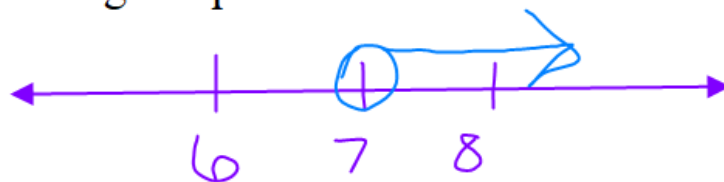
are the coordinate points that make a inequality true



Review:

Graph the following inequalities.

$$x > 7$$



$$y < -3$$



Determine whether the given point is a solution of the linear inequality.

1. $y \leq -2x + 1$; $(2, 2)$
 $2 \leq -2(2) + 1$
 $2 \leq -4 + 1$
 $2 \leq -3$ NO

4. $y > x - 1$; $(0, 1)$
 $1 > 0 - 1$
 $1 > -1$ yes

1 EXAMPLE Graph $y > -2x + 1$.

$$y = -2x + 1$$

$$2 > -2(4) + 1$$

$$-8 + 1$$

$$y = mx + b$$

$$2 > -7 \checkmark$$

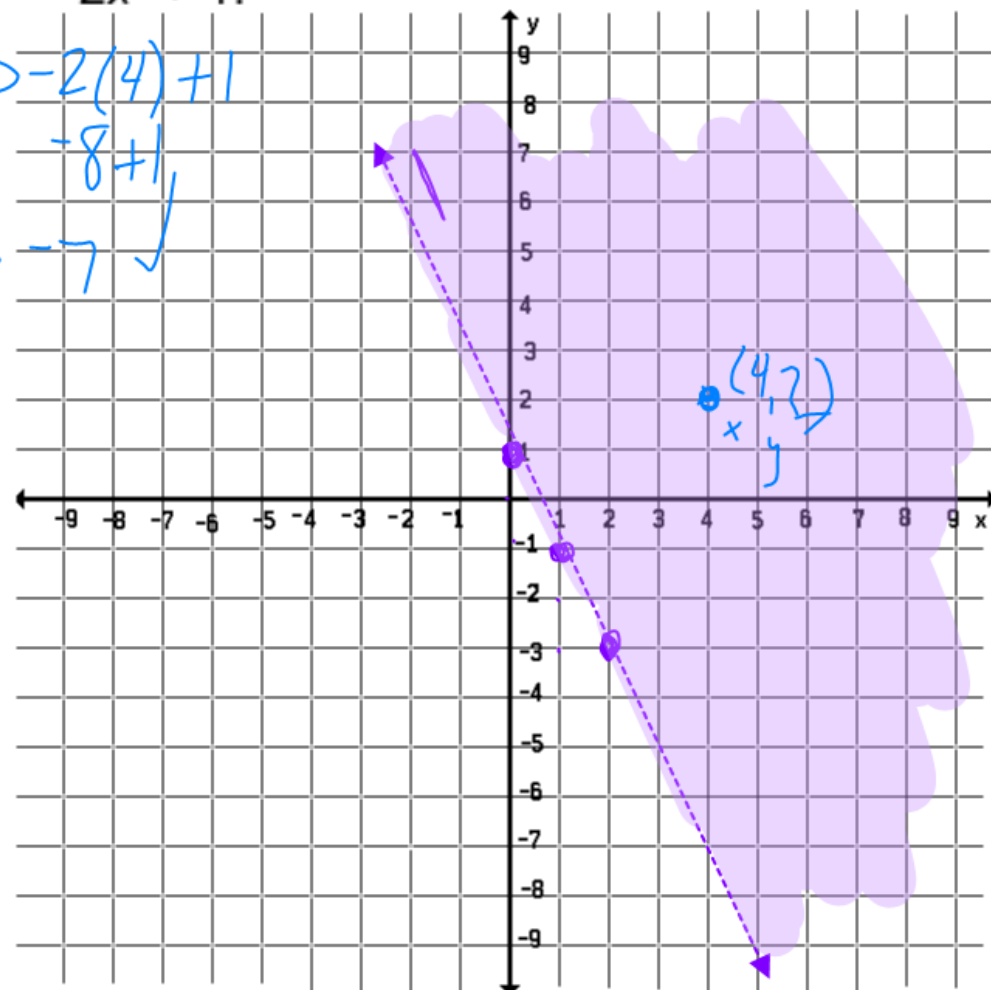
-2 down
1 right

$> <$ dashed line
0

$\geq \leq$ solid line
•

$> \geq$ above

$< \leq$ below



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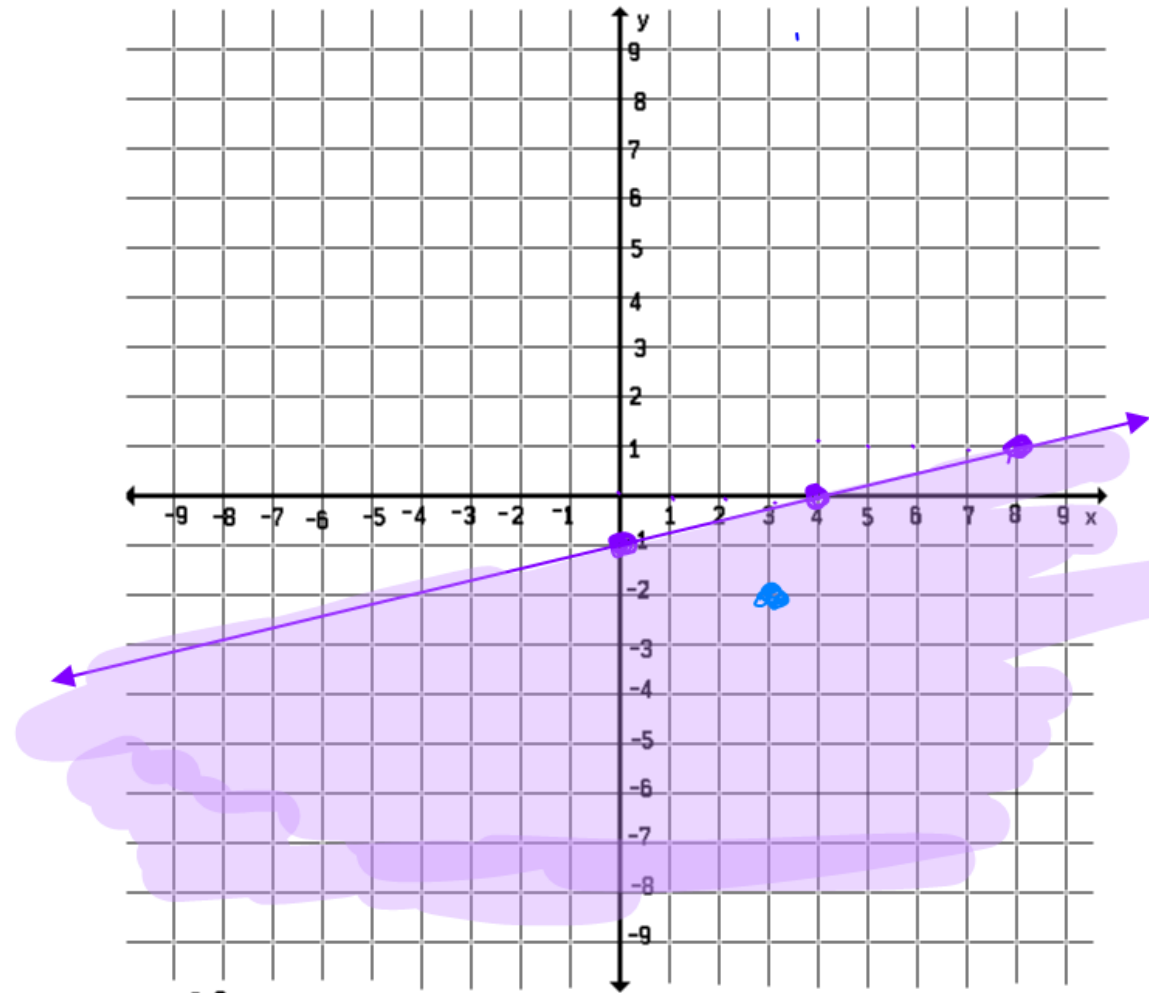
$$y \leq \frac{1}{4}x - 1$$

$\frac{1}{4}$ UP
4 right

$$-2 \leq \frac{1}{4} \cdot 3 - 1$$

$$\frac{3}{4} - 1$$

$$-2 \leq \frac{1}{4}$$



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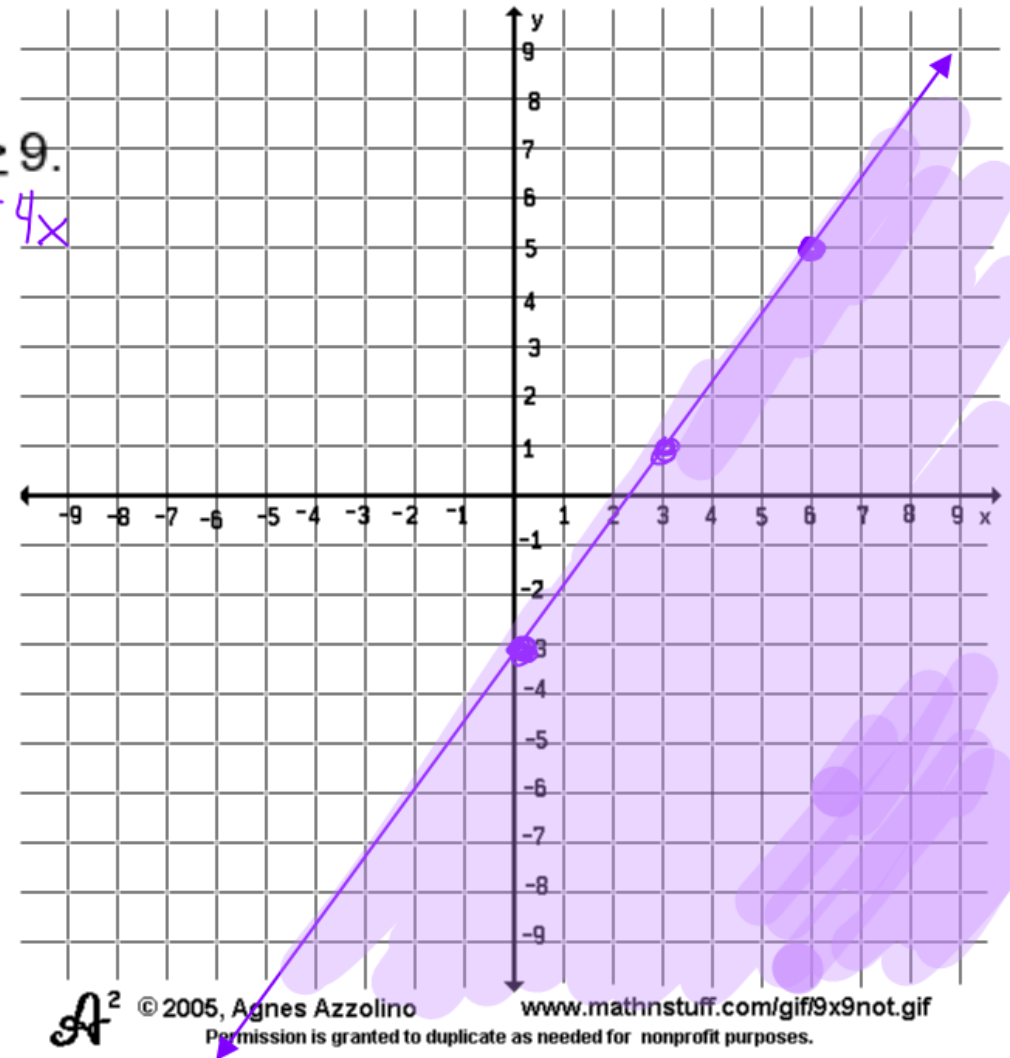
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2 EXAMPLE Graph $4x - 3y \geq 9$.

$$-\frac{3y}{-3} \geq \frac{4x + 9}{-3}$$

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



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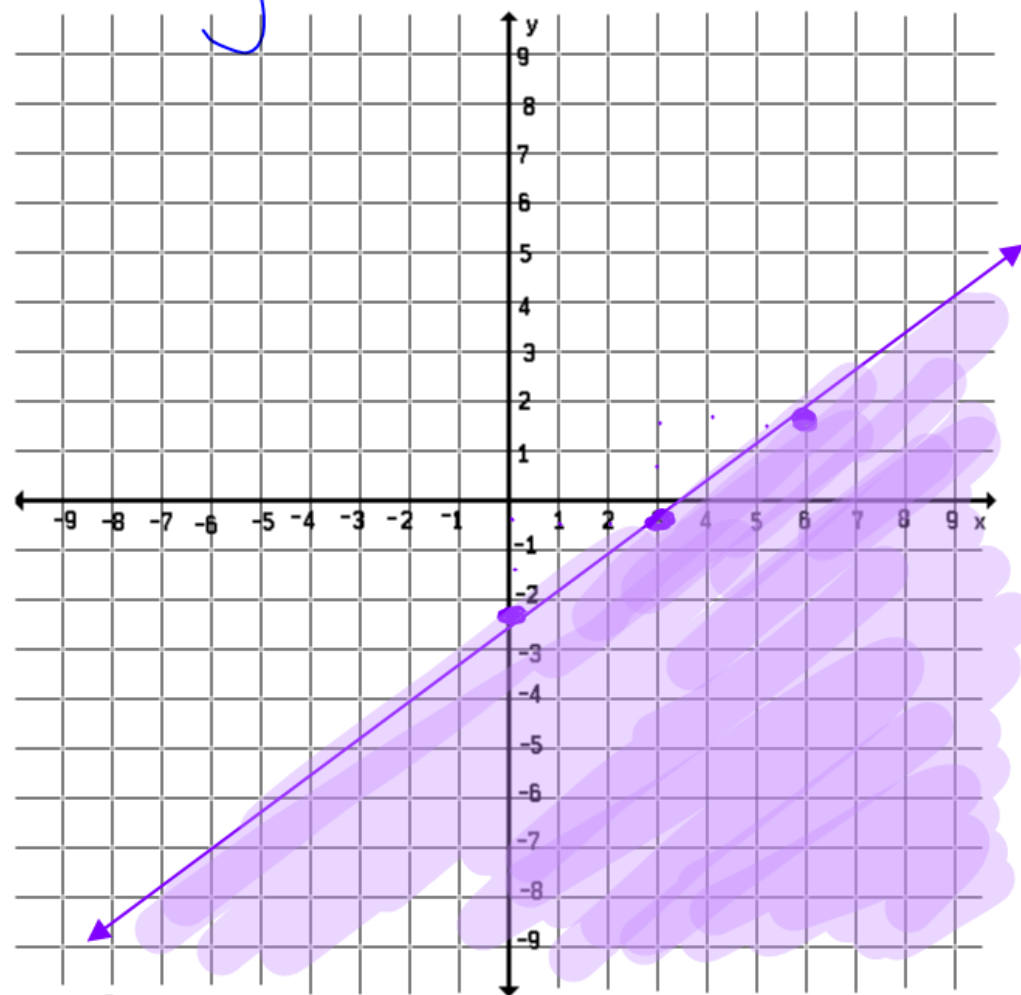
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Graph: $2x - 3y \geq 7$

$$\frac{-3y}{-3} \geq \frac{2x + 7}{-3}$$

$$y \leq \frac{2}{3}x - 2\frac{1}{3}$$



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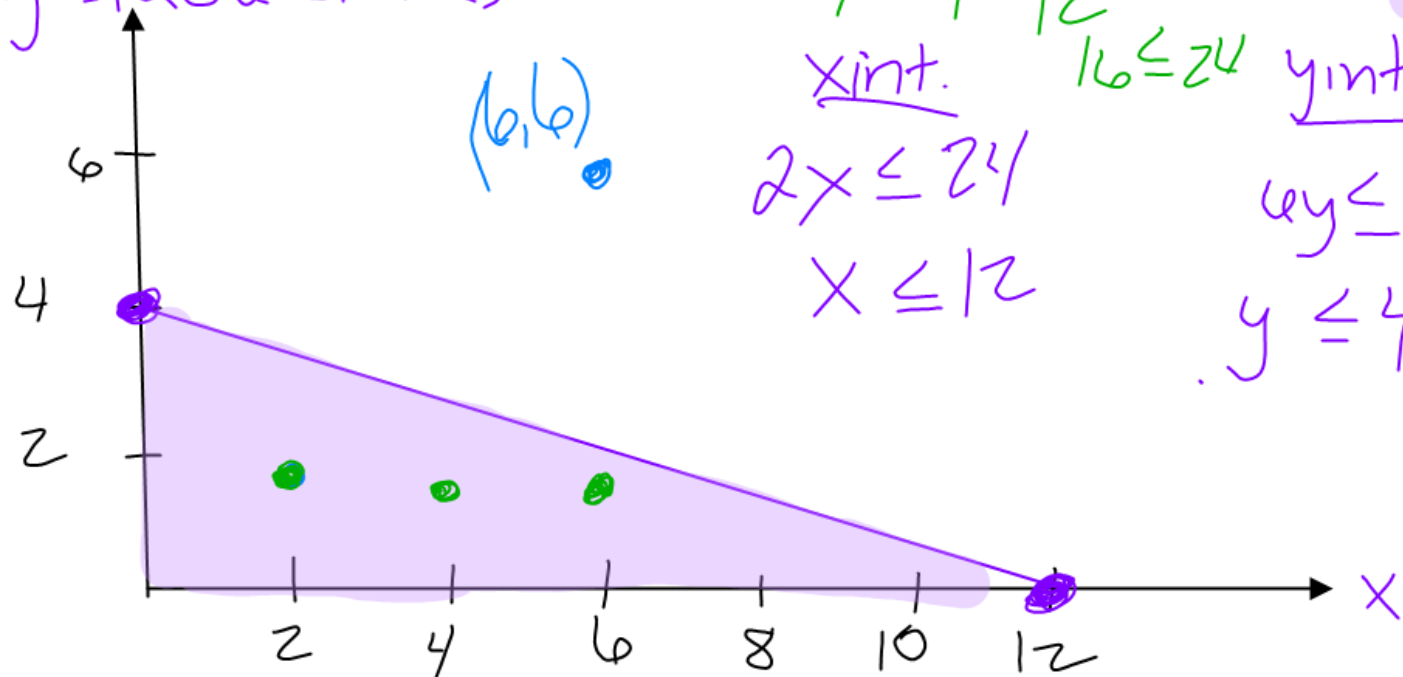
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3 EXAMPLE Suppose your budget allows you to spend no more than \$24 for decorations for a party. Streamers cost \$2 a roll and tablecloths cost \$6 each. Use intercepts to graph the inequality that represents the situation. Find three possible combinations of streamers and tablecloths you can buy.

$x = \text{Streamers}$

$y = \text{tablecloths}$

tablecloths



$$48 \leq 24$$

$$2x + 6y \leq 24$$

$12 + 36$
 $4 + 12$

$x \text{ int.}$ $16 \leq 24$ $y \text{ int.}$

$$2x \leq 24$$

$$x \leq 12$$

$$6y \leq 24$$

$$y \leq 4$$

$$2s. \quad \$ 2 t.$$

$$6s. \quad \$ 2 t.$$

$$4s. \quad \$ 2 t.$$

Streamers

Homework: pg. 407 #5,6,8,10,14,17,21,23,42,51,58,64

$$5) \quad 0 \geq -2/5(0) + 4$$

$$0 \geq 0 + 4$$

$$0 \geq 4 \quad \text{NO}$$

$$6) \quad 1 > 5/3(0) - 4$$

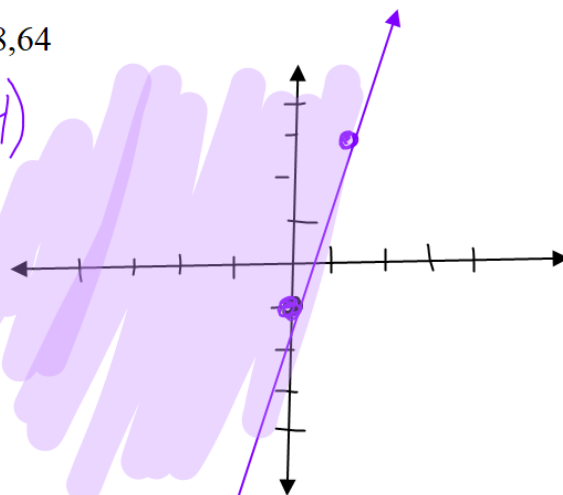
$$1 > 0 - 4$$

$$1 > -4 \quad \text{yes}$$

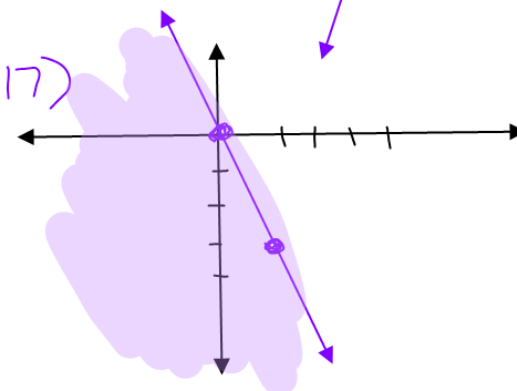
8) B

10) A

14)



17)



$$21) \quad \begin{array}{r} 4x - 6y \geq 16 \\ -4x \quad -4x \end{array}$$

$$\begin{array}{r} -6y \geq -4x + 16 \\ -6 \quad -6 \quad -6 \end{array}$$

$$y \leq \frac{2}{3}x - 2\frac{2}{3}$$

then graph

$$42) \quad \frac{6y > -4x + 12}{6}$$

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