

# Algebra 1 Lesson 6.7 Notes Graphing Linear Inequalities

Name KEY

**Objectives:**

- Graph a linear inequality and identify which side of the graph to shade.
- Graph linear inequalities of horizontal and vertical lines.

## 6.7 Graphing Linear Inequalities

**Steps to graphing linear inequalities:**

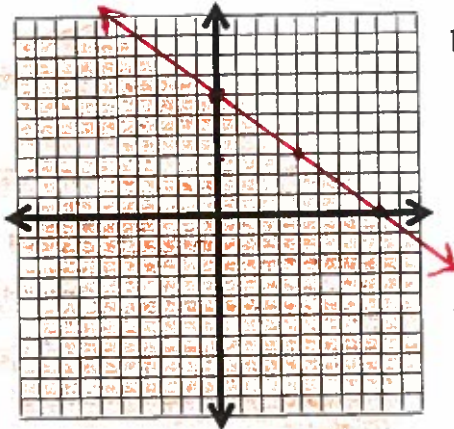
1. Solve for  $y$  (remember to switch the inequality if you multiply/divide by a NEGATIVE)
2. Draw the line using the slope and  $y$ -intercept solid or dashed based on the inequality symbol.
  - Use a **SOLID** line if the symbol is  $\geq$  or  $\leq$ . ← "OR EQUAL TO"
  - Use a **DASHED** line if the symbol is  $>$  or  $<$ . ← "DASHED"
3. Shade ABOVE or BELOW the  $y$ -intercept.
  - Shade **ABOVE** the  $y$ -intercept if the symbol is  $>$  or  $\geq$ .
  - Shade **BELOW** the  $y$ -intercept if the symbol is  $<$  or  $\leq$ .

**Practice 1: Graph the linear inequality on a coordinate plane.**

IF YOU TEST ORDERED PAIRS ALGEBRAICALLY YOU WILL GET TRUE STATEMENT IF ITS A SOLUTION.

a)  $y \leq -\frac{3}{4}x + 6$

$b = 6$   
 $m = -\frac{3}{4}$

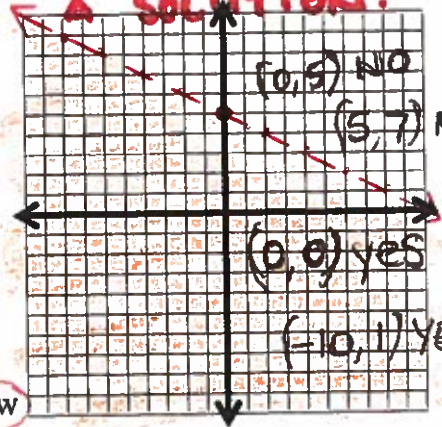


Line: dotted/solid

Shaded: above/below

b)  $x + 2y < 10$

$\frac{-x}{-1} < \frac{-x + 10}{-2}$   
 $y < -\frac{1}{2}x + 5$

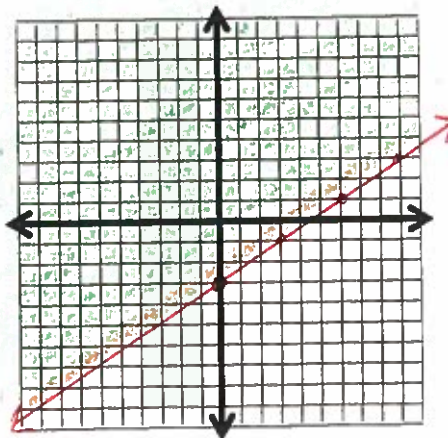


Line: dotted/solid

Shaded: above/below

c)  $2x - 3y \leq 9$

$\frac{-2x}{-3} \leq \frac{-2x + 9}{-3}$   
 $y \geq \frac{2}{3}x - 3$

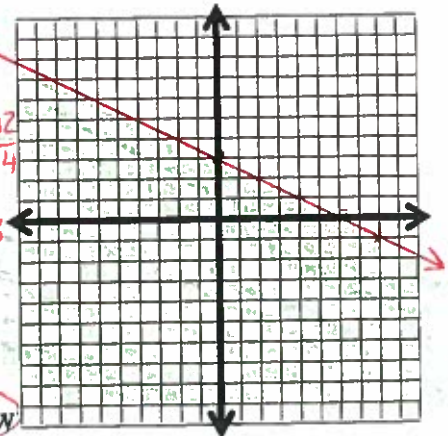


Line: dotted/solid

Shaded: above/below

d)  $4y + 2x \leq 12$

$\frac{-2x}{4} \leq \frac{-2x + 12}{4}$   
 $y \leq -\frac{1}{2}x + 3$



Line: dotted/solid

Shaded: above/below

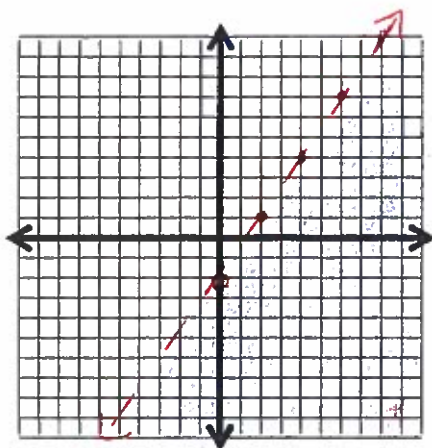
$$e) \frac{9x - 6y > 12}{-9x \quad -9x}$$

$$\frac{-6y > 9x + 12}{-6 \quad -6 \quad -6}$$

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

Line: dotted/solid

Shaded: above/below

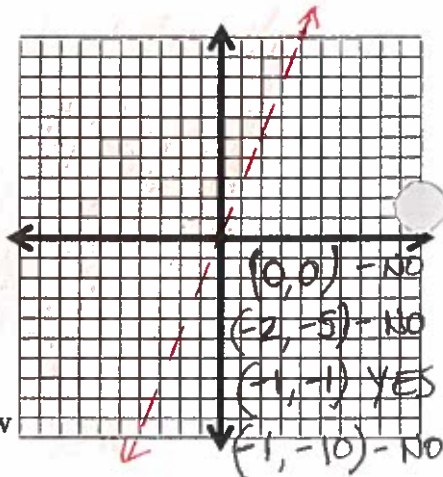


$$f) \frac{2y > 5x}{2}$$

$$y > \frac{5}{2}x$$

Line: dotted/solid

Shaded: above/below



### Special Lines

#### Horizontal Lines

➤ Shade **BELOW** the y-intercept for  $\leq$  and **ABOVE** the y-intercept for  $\geq$ .

#### Vertical Lines

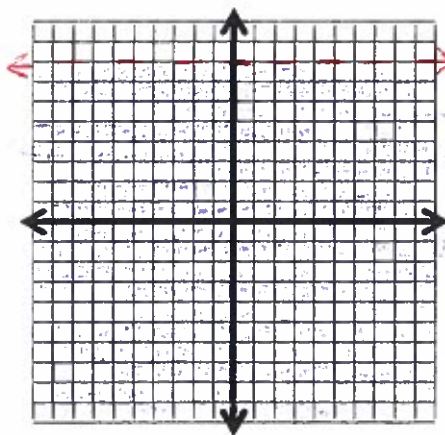
➤ Shade to the **LEFT** of the line for  $\leq$  and to the **RIGHT** of the line for  $\geq$ .

### Practice 2: Graph the linear inequality on a coordinate plane.

$$a) \frac{y + 4 < 12}{-4 \quad -4}$$

$$y < 8$$

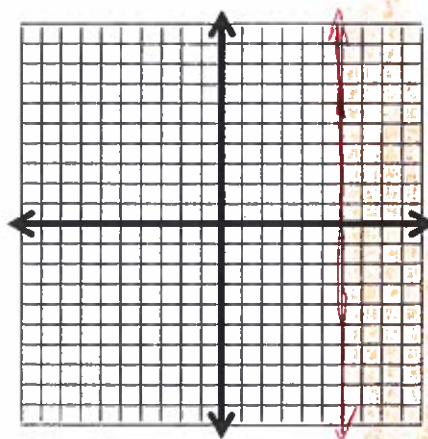
HORIZONTAL  
DOTTED  
BELOW



$$b) \frac{x - 4 \geq 2}{+4 \quad +4}$$

$$x \geq 6$$

VERTICAL  
SOLID  
RIGHT

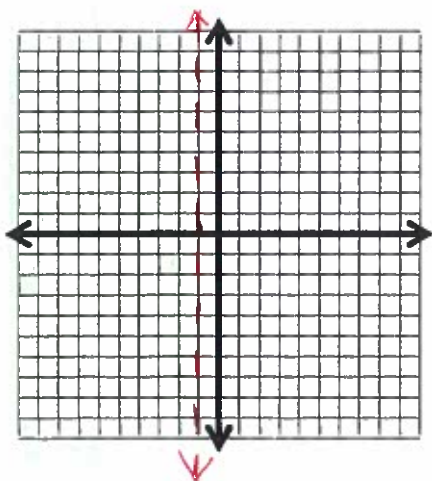


$$c) \frac{4 - x > 5}{-4 \quad -4}$$

$$\frac{-x > 1}{-1 \quad -1}$$

$$x < -1$$

VERTICAL  
DOTTED  
LEFT

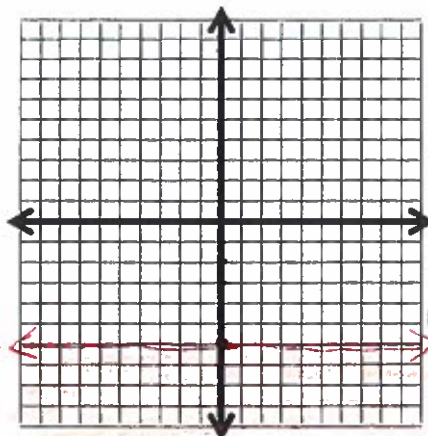


$$d) \frac{8 - y \geq 14}{-6 \quad -8}$$

$$\frac{-y \geq 6}{-1 \quad -1}$$

$$y \leq -6$$

HORIZONTAL  
SOLID  
BELOW



# Worksheet 6.7

Name KEY

**Which ordered pair is a solution of the inequality?**

1.  $x + y < -1$ ;  $(-3, -1)$  or  $(0, 2)$

$-3 + (-1) < -1$   
 $-4 < -1$  ✓  
 $0 + 2 < -1$   
 $2 < -1$

2.  $2x + 3y \leq 2$ ;  $(5, 2)$  or  $(2, -1)$

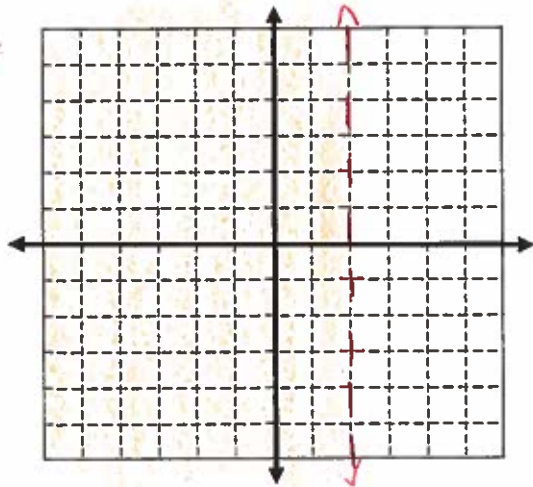
$2(5) + 3(2) \leq 2$   
 $10 + 6 \leq 2$   
 $16 \leq 2$   
 $2(2) + 3(-1) \leq 2$   
 $4 - 3 \leq 2$   
 $1 \leq 2$

3.  $5x - 3y > 15$ ;  $(4, -3)$  or  $(2, 2)$

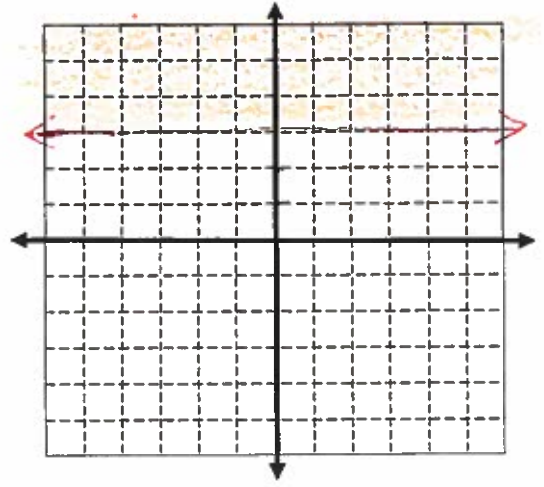
$5(4) - 3(-3) > 15$   
 $20 + 9 > 15$   
 $29 > 15$   
 $5(2) - 3(2) > 15$   
 $10 - 6 > 15$   
 $4 > 15$

**Sketch the graph of the inequality on a Cartesian coordinate system.**  
 (remember – one variable in the equation means either a vertical or horizontal line)

4.  $x < 2$

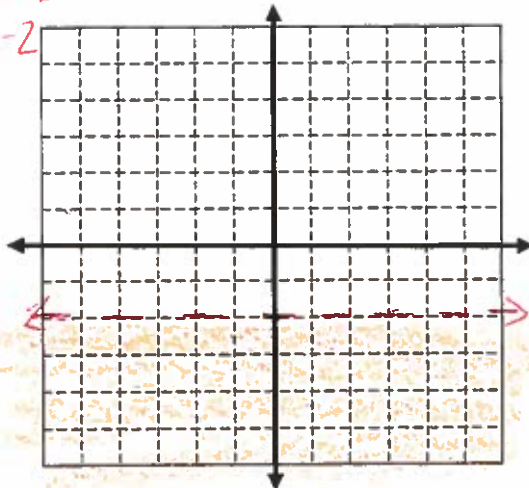


5.  $y \geq 3$



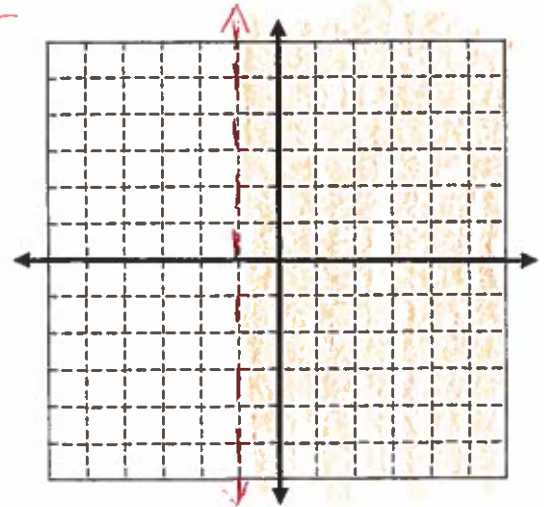
6.  $-6y > 12$

$-6 < -6$   
 $y < -2$



7.  $6 + x > 5$

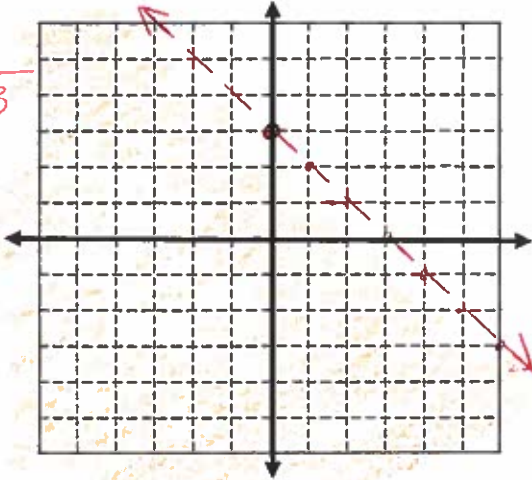
$-6 < -6$   
 $x > -1$



Hint... There are two variables ... you must solve for y first to graph!

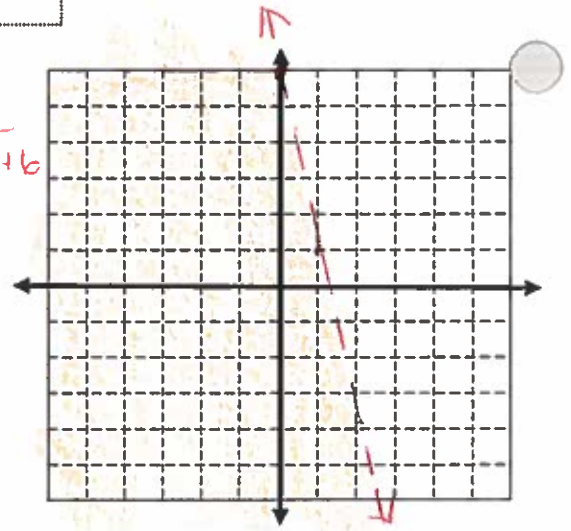
8.  $x + y < 3$

$$\begin{array}{r} -x \quad -x \\ \hline y < -x + 3 \end{array}$$



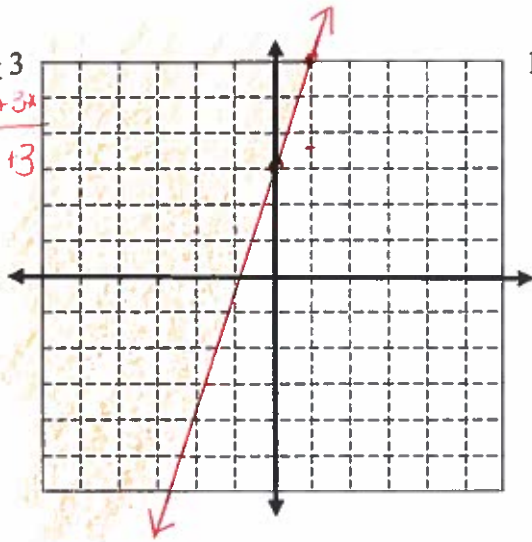
9.  $y + 5x < 6$

$$\begin{array}{r} -5x \quad -5x \\ \hline y < -5x + 6 \end{array}$$



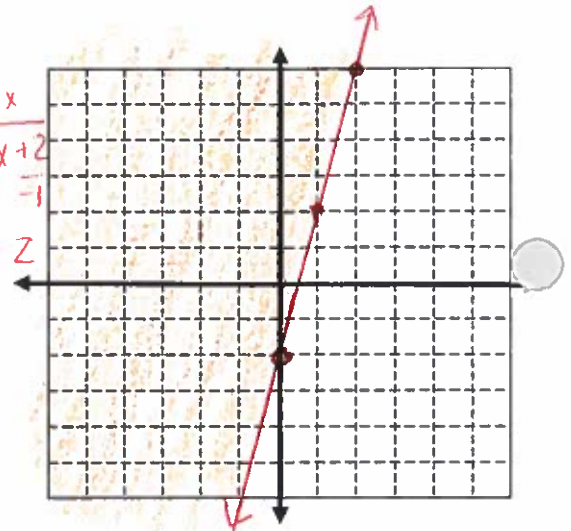
10.  $y - 3x \geq 3$

$$\begin{array}{r} +3x \quad +3x \\ \hline y \geq 3x + 3 \end{array}$$



11.  $4x - y \leq 2$

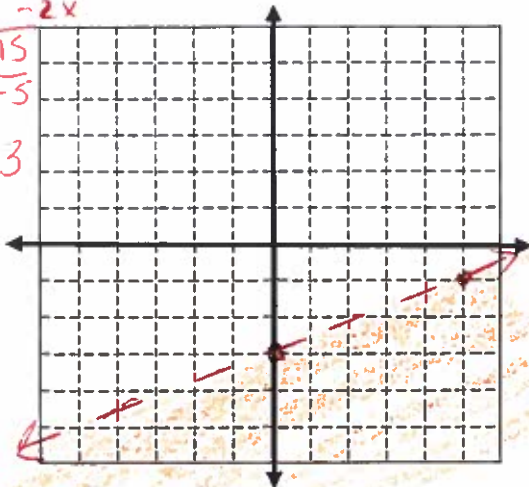
$$\begin{array}{r} -1x \quad -4x \\ \hline y \leq -4x + 2 \\ \hline y \geq 4x - 2 \end{array}$$



#11 Hmm ... Did you remember to switch the inequality since y was negative?

12.  $2x - 5y > 15$

$$\begin{array}{r} -2x \quad -2x \\ \hline -5y > -2x + 15 \\ \hline y < \frac{2}{5}x - 3 \end{array}$$



13.  $2y - x > 4$

$$\begin{array}{r} +x \quad +x \\ \hline 2y > x + 4 \\ \hline y > \frac{1}{2}x + 2 \end{array}$$

