LEARNING OBJECTIVE: We will solve linear inequalities in two variables.
(Lesson 90)

CONCEPT DEVELOPMENT:

Recall a **linear equation** is an
equation in two variables. The
solution is a typically a straight line
on a coordinate plane.
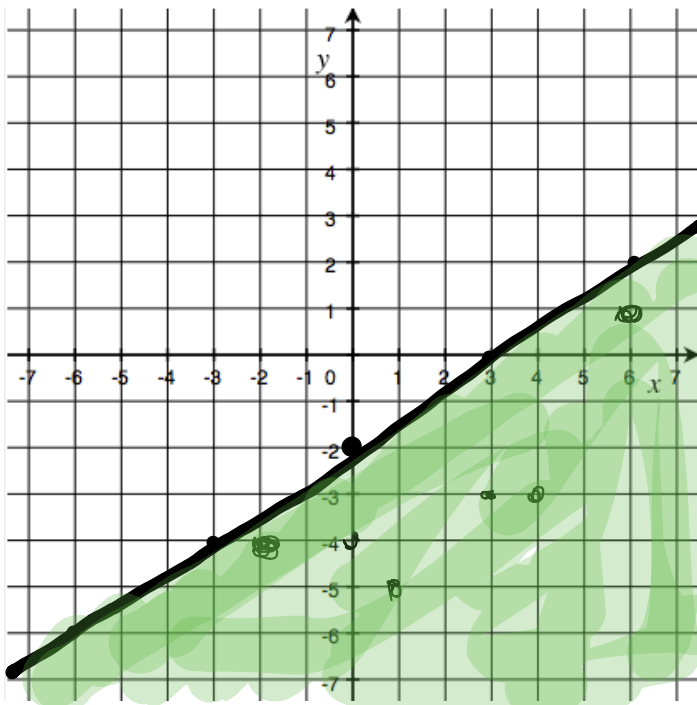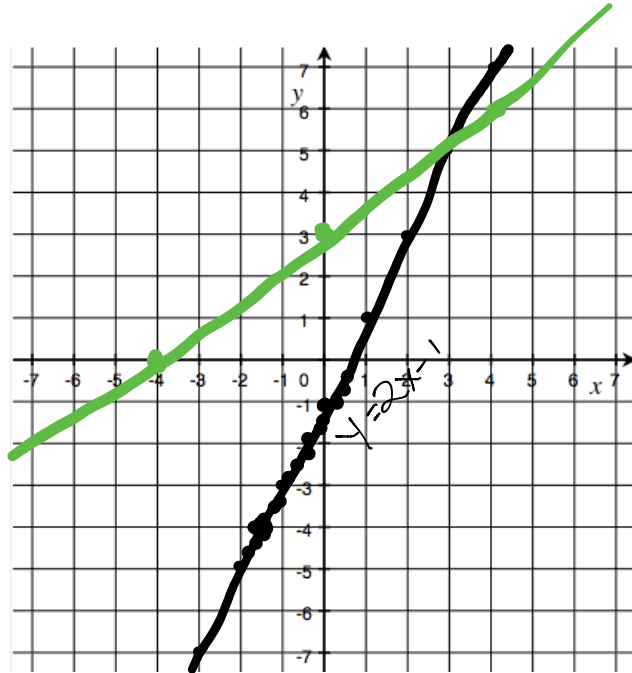*Examples*:
$y = 2x - 1$
$3x - 4y = -12$

$3(0) - 4y = -12$
$-4y = -12$ $y = 3$
$\dfrac{-4y}{-4} = \dfrac{-12}{-4}$
$3x - 4(0) = -12$
$\dfrac{3x}{3} = \dfrac{-12}{3}$ $x = -4$

$3x - 4y = -12$
$-3x \qquad -3x$
$-4y = -3x - 12$
$\dfrac{-4y}{-4} = \dfrac{-3x}{-4} - \dfrac{12}{-4}$
$\boxed{y = \frac{3}{4}x + 3}$

Linear Inequalities result when
you replace the equal sign an
inequality symbol. The solution is
a region on a coordinate plane
that is determined by the
boundary line.
Example:

$2x - 3y \geq 6$
$2(2) - 3(2) \geq 6$
$2(3) - 3(-3) \geq 6$
$2(6) - 3(1) \geq 6$
$2(-2) - 3(-4) \geq 6$

$2x - 3y \geq 6$
$-2x \qquad\qquad -2x$
$\dfrac{-3y}{-3} \geq \dfrac{-2x}{-3} + \dfrac{6}{-3}$
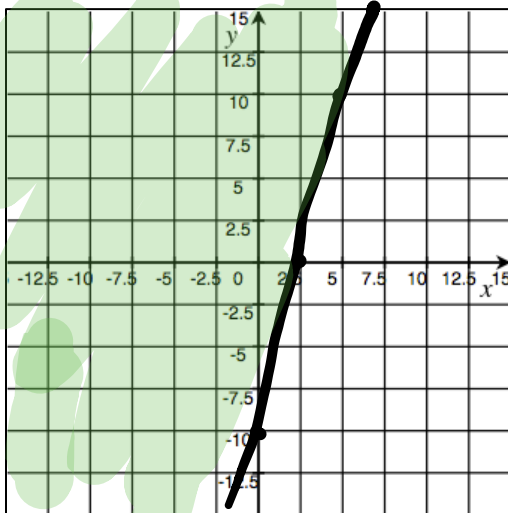$\boxed{y \leq \frac{2}{3}x - 2}$

half-plane: a solution set
of a linear inequality in 2 variables.

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GUIDED PRACTICE:

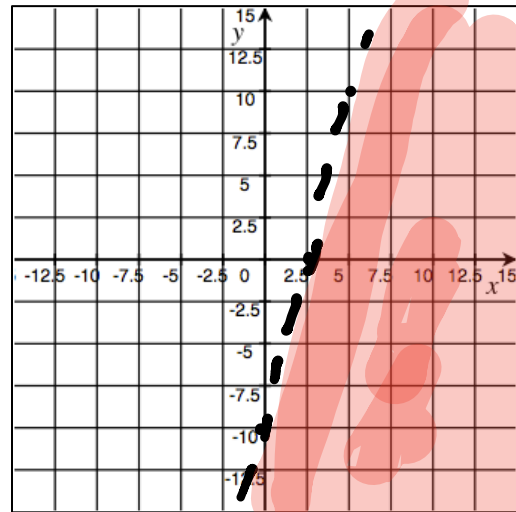**Steps for Graphing Inequalities in Two Variables**
1. Change the inequality (as needed) so that the inequality resembles slope-intercept form.
2. Temporarily replace the inequality sign with an equal sign.
3. Graph the linear equation.
4. Reinsert the inequality sign.
5. If the line is a PART of the solution ($\leq$ or $\geq$), the graph is a solid line. If the line is NOT a part of the solution ($<$ or $>$), the graph is a dashed line.
6. If the inequality is greater than ($>$ or $\geq$) shade the area ABOVE the line. If the inequality is less than ($<$ or $\leq$), shade the area BELOW the line.

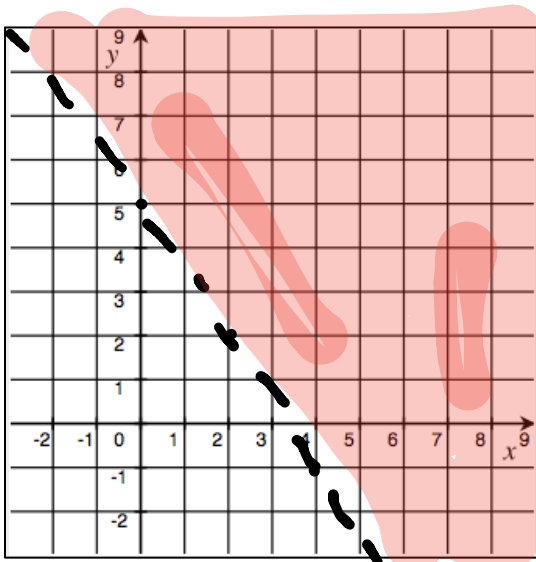| Graph $4x - y \leq 10$	Graph $4x - y > 10$
$-4x \qquad -4x$ $\dfrac{-y}{-1} \leq \dfrac{-4x}{-1} + \dfrac{10}{-1}$ $y \geq 4x - 10$	$y < 4x - 10$

Graph $3x + 2y > 10$

$-3x \qquad -3x$

$$\frac{2y}{2} > \frac{-3x}{2} + \frac{10}{2}$$

$$y > -\frac{3}{2}x + 5$$

Graph $x - y > 6$

$-x \qquad -x$

$$\frac{-y}{-1} > \frac{-x}{-1} + \frac{6}{-1}$$
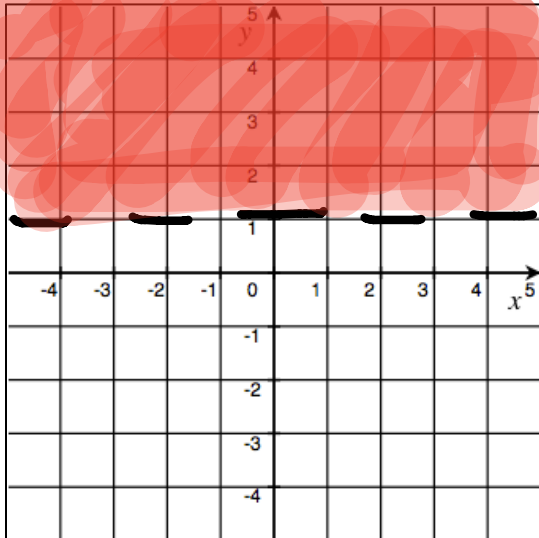
$$y < x - 6$$
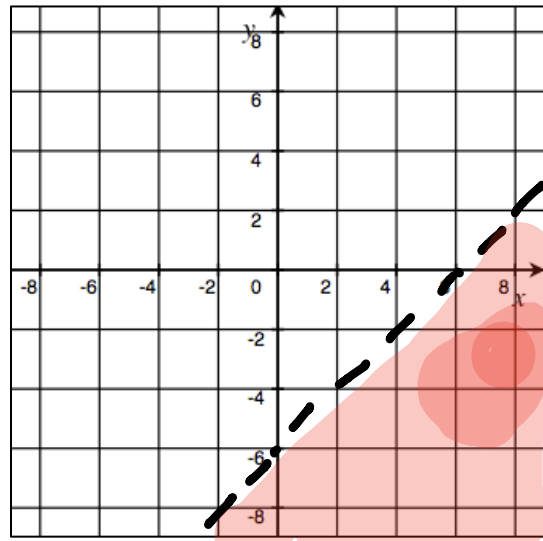
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Mr. Rogove   Date: _____
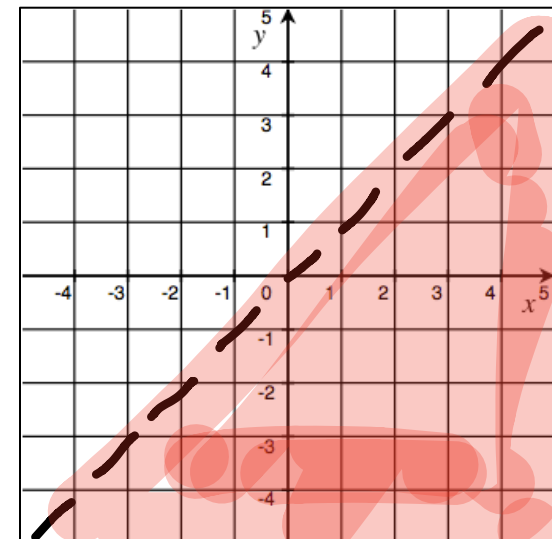
Graph $y > 1$	Graph $x \leq -3$
Graph $y > x$	Graph $y < x$

Independent Practice:

Two Khan Exercises:
Graphs of Inequalities in Two Variables
Graphing Linear Inequalities in Two Variables.

Activating Prior Knowledge:

Closure:

Notes:

Maps to lesson 7-4 of Algebra 1 (GO MATH) and Lesson 21 of ENY Alg 1.
HW Khan: Graphing and Solving Linear Inequalities