

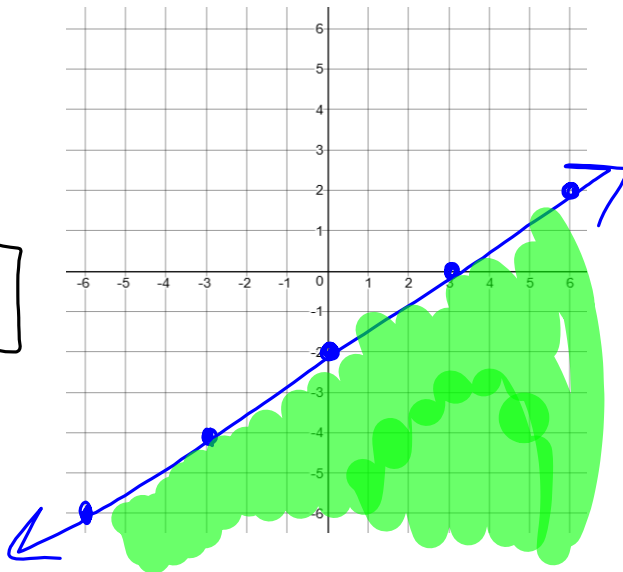
5.2 - Day 1 - Systems of Inequalities

EXAMPLE 1 Graphing a Linear Inequality in Two Variables

Graph: $2x - 3y \geq 6$.

$$\begin{aligned} & \underline{-2x} \quad \nearrow \\ -3y & \geq -2x + 6 \\ \underline{-3} \quad \searrow & \quad \underline{-3} \quad \underline{-3} \\ y & \leq \frac{2}{3}x - 2 \end{aligned}$$

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



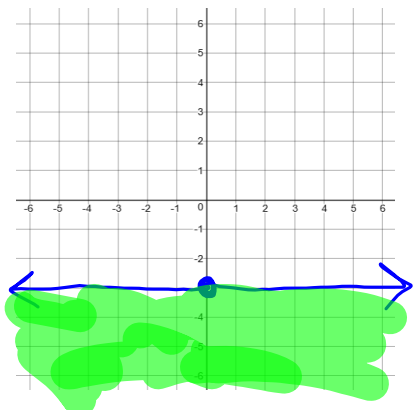
HW Day 1:
#s: 27, 29, 35, 40, 45, 57
60, 62, 110, 111

Graphing other Inequalities

Graph each inequality in a rectangular coordinate system:

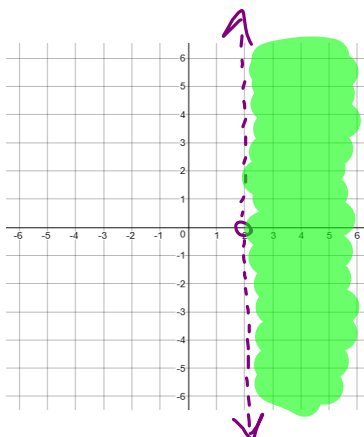
a. $y \leq -3$

horizontal



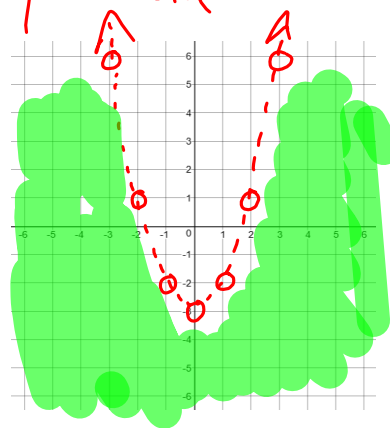
b. $x > 2$.

vertical



c. $y < x^2 - 3$

parabola



Graphing Systems of Linear Inequalities

The solution set of a system of linear inequalities in two variables is the set of all ordered pairs that satisfy each inequality in the system. Thus, to graph a system of inequalities in two variables, begin by graphing each individual inequality in the same rectangular coordinate system. Then find the region, if there is one, that is common to every graph in the system. This region of intersection gives a picture of the system's solution set.

EXAMPLE 6 Graphing a System of Linear Inequalities

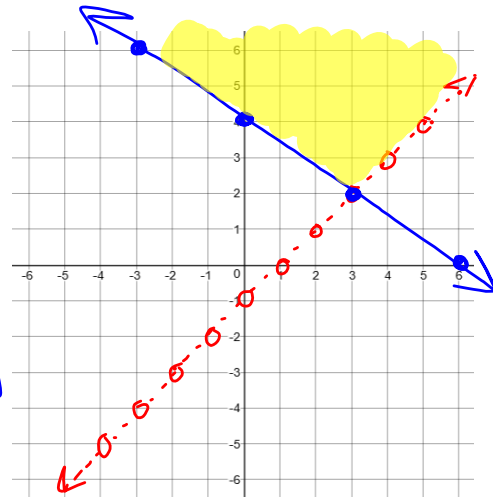
Graph the solution set of the system:

$$\begin{cases} x - y < 1 \\ 2x + 3y \geq 12 \end{cases}$$

$$\frac{-y}{-1} < \frac{-x+1}{-1} \quad \frac{3y}{3} \geq \frac{-2x+12}{3}$$

$$y > x - 1 \quad y \geq -\frac{2}{3}x + 4$$

↑ shade above ↑ shade above



EXAMPLE 7 Graphing a System of Inequalities

Graph the solution set of the system:

$$\begin{cases} y \geq x^2 - 4 \\ x - y \geq 2 \end{cases}$$

shade above ↑

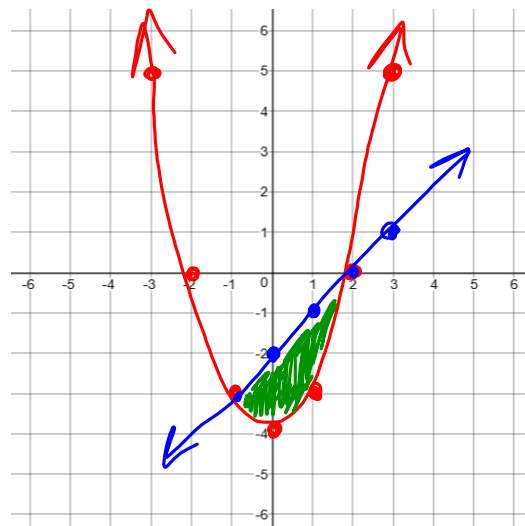
Parabola

x	y
3	5
2	0
1	-3
0	-4
-1	-3
-2	0
-3	5

$$\frac{-y}{-1} \geq \frac{-x+2}{-1}$$

$$y \leq x - 2$$

shade below ↓



EXAMPLE 8 Graphing a System of Inequalities

Graph the solution set of the system:

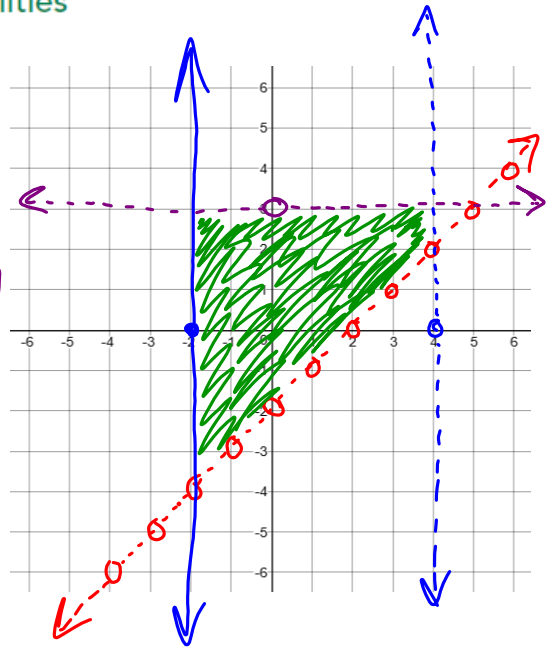
$$\begin{cases} x - y < 2 \\ -2 \leq x < 4 \\ y < 3 \end{cases}$$

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

$$y > x - 2$$
 (shaded above)

Two vertical lines
 $\rightarrow \leftarrow$
 (in between)

Horizontal line
 shade below



Check Point

Graph the solution set of the system:

$$\begin{cases} 3x + y \leq 6 \\ 2x - y \leq -1 \\ x > -2 \\ y < 4 \end{cases}$$

$$y \leq -3x + 6$$
 (shaded below)

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

$$y \geq 2x + 1$$
 (shaded above)

vertical line (shaded right)
 \rightarrow

horizontal line (shaded below)
 \downarrow

