GUIDED NOTES: Solve Systems of Inequalities

To solve a system of inequalities, we need to find the ordered pairs that satisfy all of the inequalities of the system. The solution is their **shading overlap**.

Solid Line	Dotted Line	Shade Above	Shade Below
$\geqslant$ $\leqslant$	$>$ $<$	$>$ $\geqslant$	$<$ $\leqslant$

EX1. Solve the system of inequalities by graphing:

$3x + y \leq 4$

$x - 2y > -4$

$$3x + y \leq 4$$
$$\underline{-3x \qquad -3x}$$
$$y \leq 4 - 3x$$

$$x - 2y > -4$$
$$\underline{\qquad -x}$$
$$\frac{-2y}{-2} > \frac{-4}{-2} \frac{-x}{-2}$$
$$y < 2 + \tfrac{1}{2}x$$

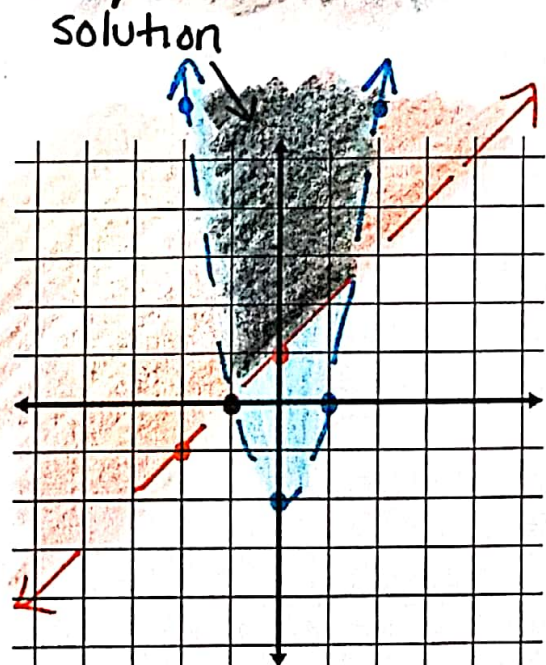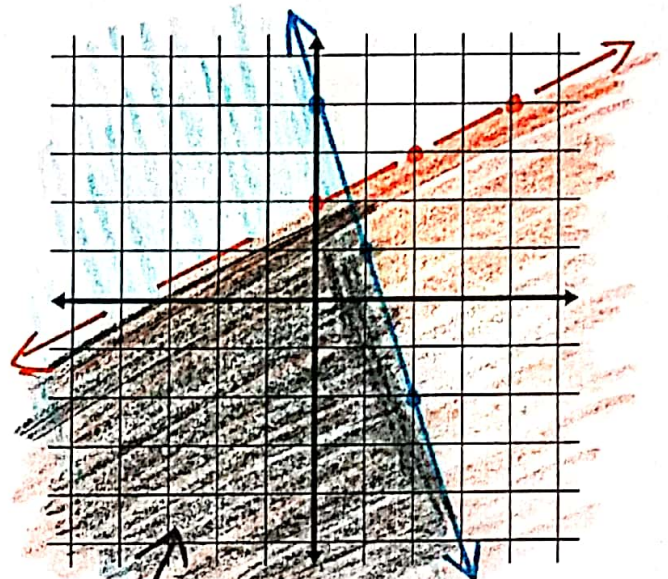*If you divide by a negative number, flip the inequality.

Solution

EX2. Solve the system of inequalities by graphing:

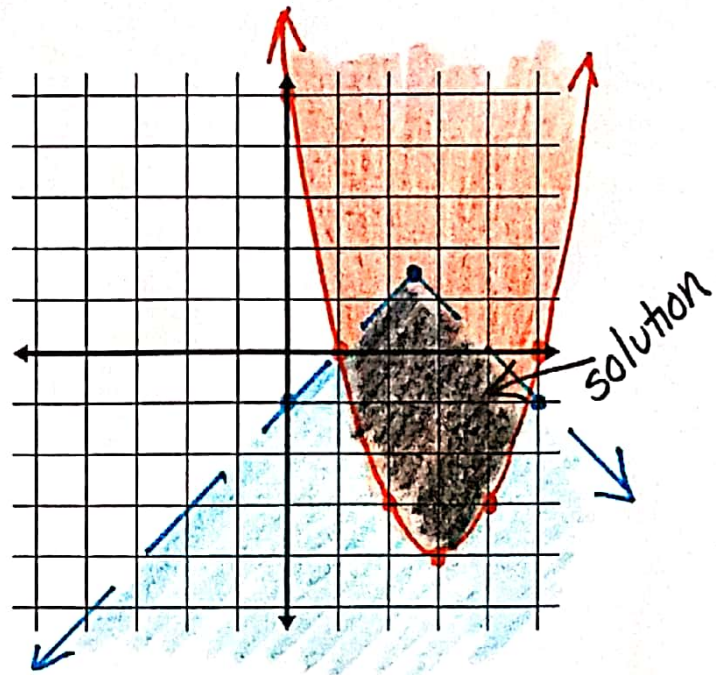$y > 2x^2 - 2$

$y > x + 1$

$$y > 2x^2 - 2 \qquad y > x + 1$$

EX3. Solve the system of inequalities by graphing:

$$y < -3\left|\tfrac{2}{5}x - 1\right| + 2$$
$$y + 4 \geq (x-3)^2$$

$$y < -3\left|\tfrac{2}{5}x - 1\right| + 2 \qquad y + \underset{-4}{\cancel{4}} \geq (x-3)^2$$
$$\underline{\hspace{2cm}} \quad -4$$
$$Y \geq (x-3)^2 - 4$$

solution

EX4. Solve the system of inequalities by graphing:

$$-y > x$$
$$y \leq 3$$
$$x \leq 5$$

$$\frac{\cancel{+}Y > X}{\cancel{-1} \; -1} \qquad Y \leq 3 \qquad X \leq 5$$
$$Y < -X$$

Solution