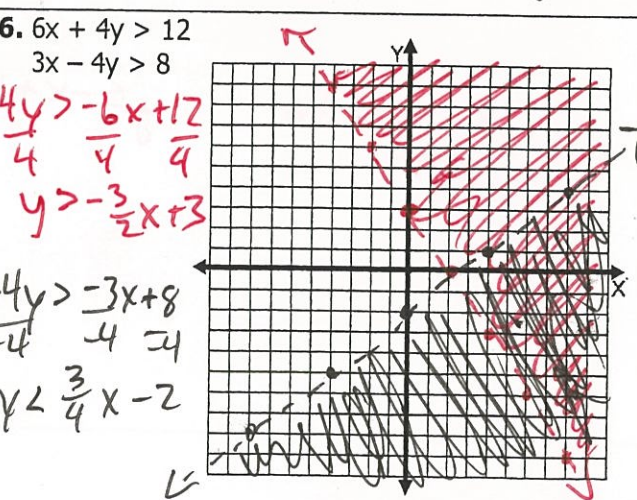
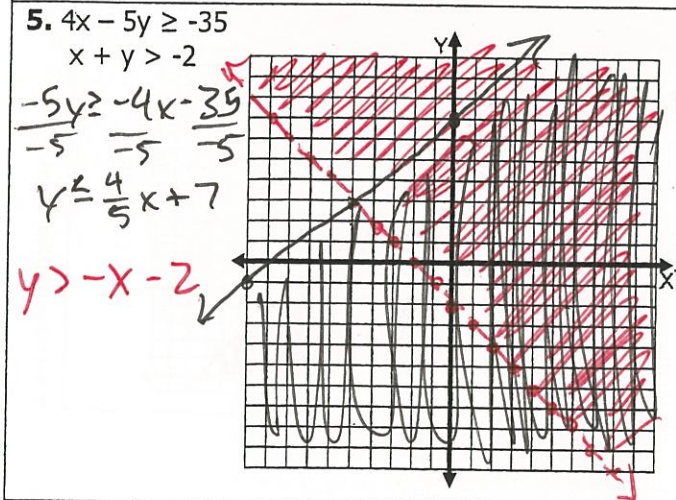
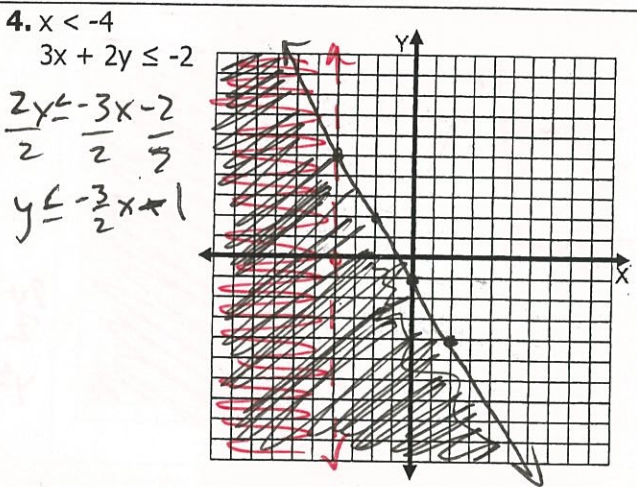
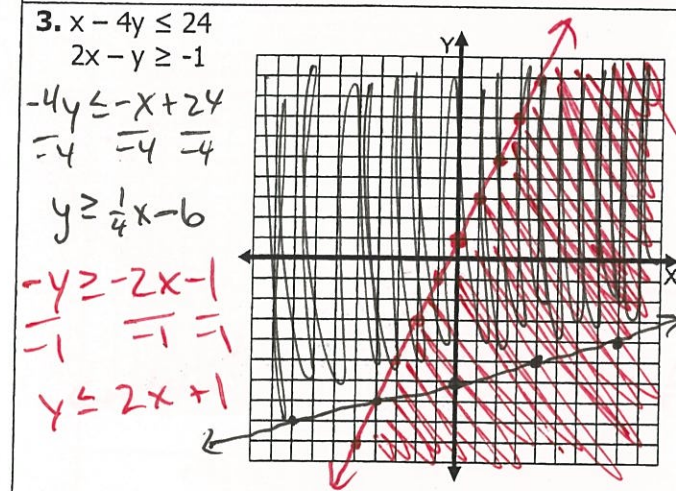
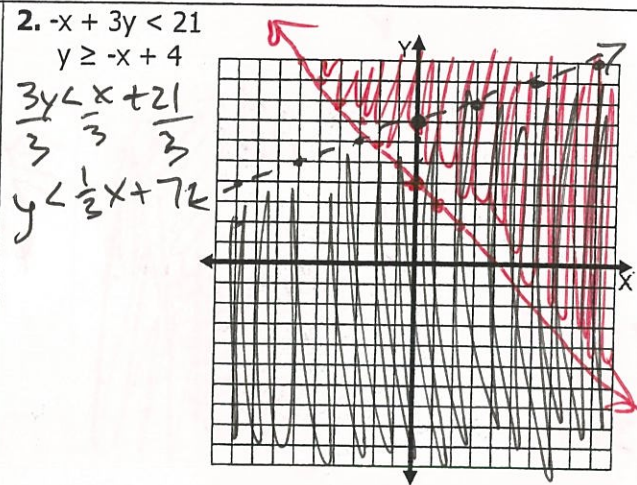
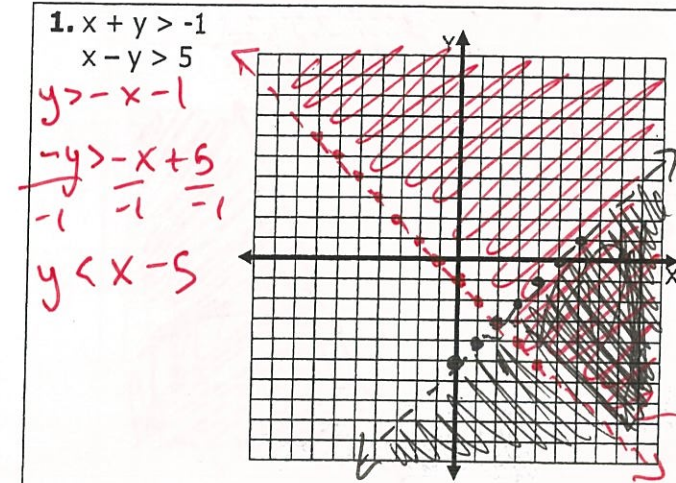


# SYSTEMS OF INEQUALITIES

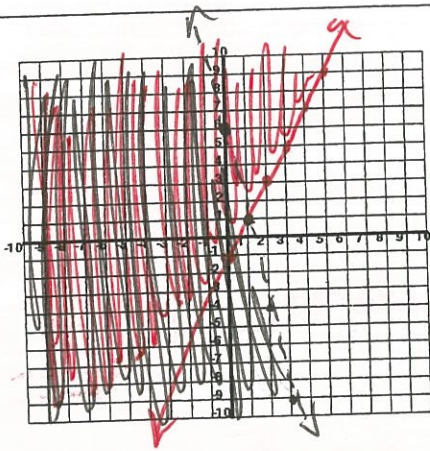
A system of inequalities is two or more linear inequalities.

The **solution** to a system of inequalities is the ordered pairs of points that satisfies **both** inequalities.





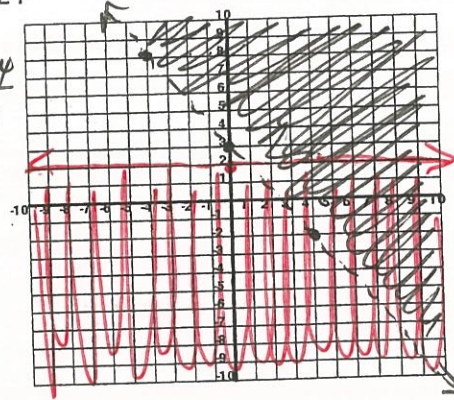
$$7. \begin{cases} y < -5x + 6 \\ y \geq 2x - 1 \end{cases}$$



$$8. \begin{cases} 8y > -10x + 24 \\ y \leq 2 \end{cases}$$

$$\frac{8y}{8} > \frac{-10x + 24}{8}$$

$$y > -\frac{5}{4}x + 3$$



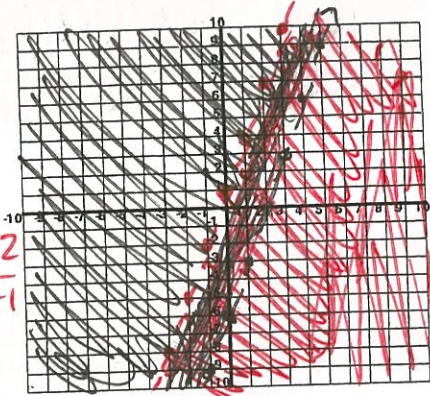
$$9. \begin{cases} 3x - y < 6 \\ 3x - y > -2 \end{cases}$$

$$\frac{-y < -3x + 6}{-1} \quad \frac{-y > -3x - 2}{-1}$$

$$y > 3x - 6$$

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

$$y < 3x + 2$$



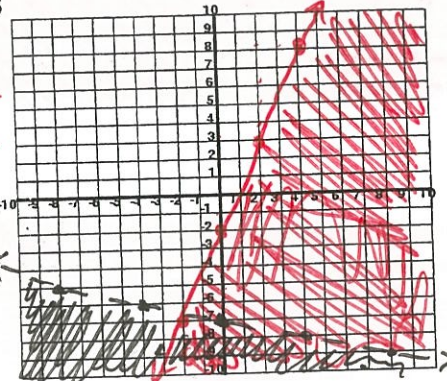
$$10. \begin{cases} 5x + 2y \geq 4 \\ x + 4y < -28 \end{cases}$$

$$\frac{-2y \geq -5x + 4}{-2}$$

$$y \leq \frac{5}{2}x - 2$$

$$\frac{4y < -x - 28}{4}$$

$$y < -\frac{1}{4}x - 7$$



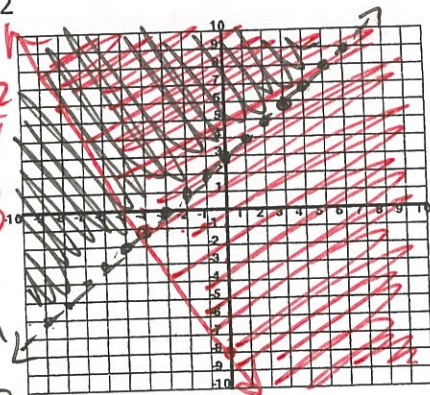
$$11. \begin{cases} 7x + 4y \geq -32 \\ x - y < -3 \end{cases}$$

$$\frac{4y \geq -7x - 32}{4}$$

$$y \geq -\frac{7}{4}x - 8$$

$$\frac{-y < -x - 3}{-1}$$

$$y > x + 3$$



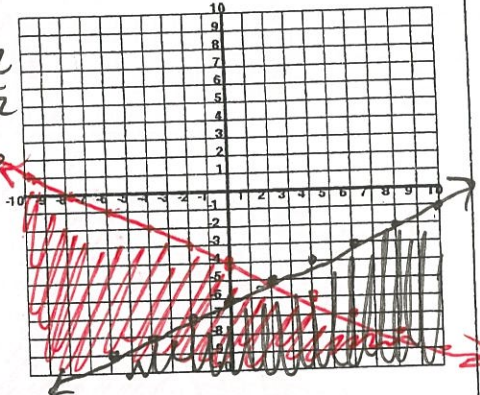
$$12. \begin{cases} x - 2y \geq 12 \\ x + 2y \leq -8 \end{cases}$$

$$\frac{-2y \geq -x + 12}{-2}$$

$$y \leq \frac{1}{2}x - 6$$

$$\frac{2y \leq -x - 8}{2}$$

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



**Application:** Sarah's Pet Store never has more than a combined total of 16 cats and dogs. She also never has more than 9 cats. Write a system of inequalities and graph to show the possible number of cats and dogs in her store.

$$\begin{cases} x + y \leq 16 \\ x \leq 9 \end{cases}$$

$$y \leq -x + 16$$

