

1.6 SOLVING LINEAR INEQUALITIES

\leq Less than or equal to; **at most**

\geq Greater than or equal to; **at least**

$<$ Less than

$>$ Greater than

If you **multiply or divide both sides by a negative number**,
YOU MUST FLIP THE INEQUALITY SIGN!

When graphing inequalities,
 make sure the **variable is on the left**.

 *closed circle*



 *open circle*

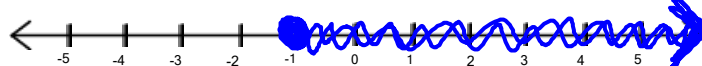


Graph the following:

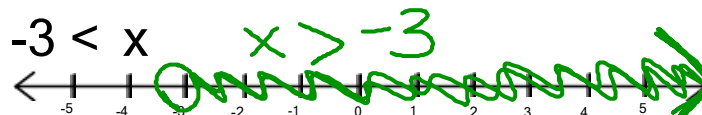
1. $x < 2$



2. $x \geq -1$



3. $-3 < x$

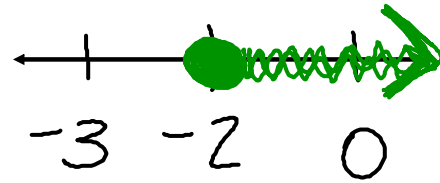


4. $x \leq 0$

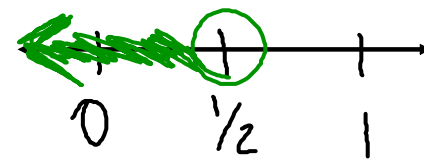


Solve and graph your solution.

$$\begin{aligned}
 5. \quad & -11y - 9 \leq 13 \\
 & \quad \quad +9 \quad +9 \\
 & \frac{-11y \leq 22}{-11} \\
 & \quad \quad \downarrow \\
 & y \geq -2
 \end{aligned}$$



$$\begin{aligned}
 6. \quad & 2x + 1 > 6x - 1 \\
 & \quad \quad -2x \quad -2x \\
 & 1 > 4x - 1 \\
 & \quad \quad +1 \quad \quad +1 \\
 & \frac{2}{4} > \frac{4x}{4}
 \end{aligned}$$



$$\frac{18}{24} > x \quad \frac{1}{2} > x$$

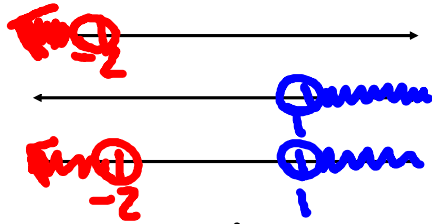
$x < \frac{1}{2}$

A compound inequality is two inequalities joined by "and" or "or".

and: solutions need to satisfy **both** inequalities (which solutions they have **in common**)

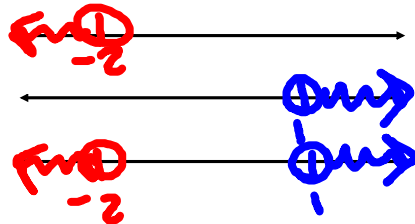
or: solutions need to satisfy **either** inequality (**combination** of the two solutions)

7. $x < -2$ and $x > 1$



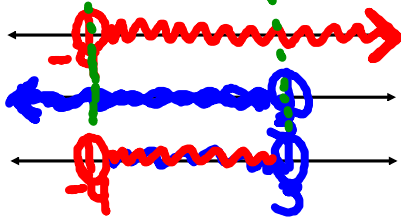
Answer: $x < -2$ or $x > 1$

8. $x < -2$ or $x > 1$



Answer: $x < -2$ or $x > 1$

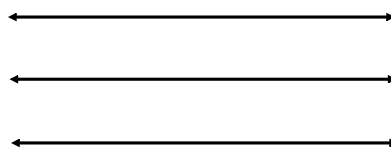
9. $x > -4$ and $x < 3$



Answer: _____

$-4 < x < 3$

10. $x > -4$ or $x < 3$



Answer: _____

11. Solve and graph.

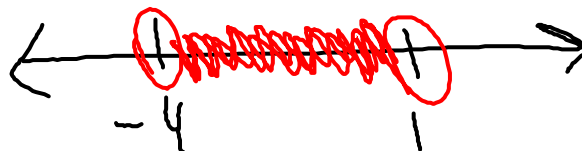
$\frac{1}{4}b + 3 \geq 2$ and $8b - 12 < -4$
 $\quad \quad \quad -3 \quad -3 \quad \quad \quad +12 \quad +12$

$4 \cdot \frac{1}{4}b > -1.4$

$\frac{8b}{8} < \frac{8}{8}$

$b > -4$ AND $b < 1$

$-4 < b < 1$



12. Solve and graph.

$$x + 8 < 5 \quad \text{or} \quad x - 1 > 3$$

13. Solve and graph.

$$-10 \leq \frac{1}{3}k - 8 \leq -5$$

14. Solve and graph.

$$-6g - 18 \leq 24 \quad \text{or} \quad 3(g + 2) < -9$$

15. Solve and graph.

$$3y - 4 > 20 \quad \text{and} \quad -2y + 7 > -5$$

16. Solve and graph.

$$3t + 5 > 11 \quad \text{and} \quad 4t - 1 \leq 15$$