

Inequalities:

a) Solving Inequalities:

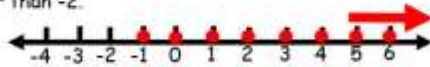
Notes:

- > Need to know the types of numbers (See Arithmetic 1b)
- > Same rules as solving linear equations (See Algebra 4a)
- > One difference: if you have to multiply/divide both sides of an inequality by a **NEGATIVE** number, we must **CHANGE THE DIRECTION** of the inequality.

Example 1: Graph the solution to $3 - 4x < 11$, $x \in \mathbb{Z}$.

$$\begin{aligned} 3 - 4x &< 11 \\ -4x &< 11 - 3 \\ -4x &< 8 \\ \frac{-4x}{-4} &< \frac{8}{-4} && \text{(dividing both sides by -4)} \\ x &> -2 && \text{(Note sign change because divided by -4)} \end{aligned}$$

For the number line, we're looking for all the Integers that are bigger than -2.



Example 2: Graph the solution to $3(x - 2) \leq -3$, $x \in \mathbb{R}$.

$$\begin{aligned} 3(x - 2) &\leq -3 \\ 3x - 6 &\leq -3 \\ 3x &\leq -3 + 6 && \text{(adding 6 to both sides)} \\ 3x &\leq 3 \\ \frac{3x}{3} &\leq \frac{3}{3} && \text{(dividing both sides by 3)} \\ \Rightarrow x &\leq 1 \end{aligned}$$

For the number line, we're looking for all the Real numbers that are smaller than or equal to 1.

