

Inequalities

A.REI.3 Solve linear equations and inequalities in one variable including equations with coefficients represented by letters. *For example, given $ax + 3 = 7$, solve for x .*

What am I learning today?

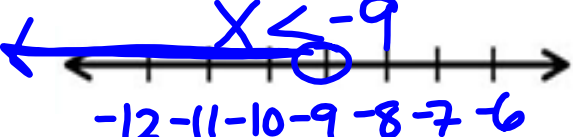
How to apply my knowledge of equations to
inequalities

How will I show that I learned it?

Solve and graph the solution set of 1 and 2-step
inequalities

Ex. 1

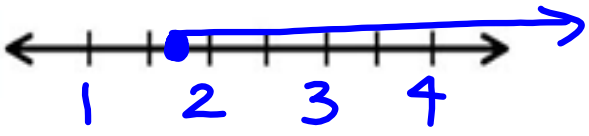
$$8x + 5 < 3x - 40$$

$$\begin{array}{r} -3x \quad -3x \\ \hline 5x + 5 < -40 \\ -5 \quad -5 \\ \hline 5x < -45 \\ \frac{5x}{5} < \frac{-45}{5} \\ x < -9 \end{array}$$


Ex. 2

$$-4(x - 7) \leq 12x$$

$$\begin{array}{r} -4x + 28 = 12x + 4x \\ +4x \quad +4x \\ \hline 28 \leq 16x \\ \frac{16x}{16} \geq \frac{28}{16} \end{array}$$

$$x \geq 1.75$$


Ex. 3

$$\begin{aligned}
 & \underbrace{-2x + 5 - x}_{-3x + 5} \geq 3(2 - x) \\
 & \begin{array}{r}
 -3x + 5 \geq 6 - 3x \\
 +3x \qquad \qquad \qquad +3x \\
 \hline
 5 \geq 6 \text{ (F)} \\
 \text{no solution}
 \end{array} \\
 & \begin{array}{c}
 \leftarrow \text{-----} \rightarrow \\
 \text{no graph}
 \end{array}
 \end{aligned}$$

Ex. 4

$$\begin{aligned}
 & \cancel{-3} \left(\frac{7 - 6x}{\cancel{-3}} \right) < (2x + 2) - \cancel{3} \\
 & \begin{array}{r}
 7 - 6x > -6x - 6 \\
 +6x \qquad \qquad \qquad +6x \\
 \hline
 7 > -6
 \end{array} \\
 & \underline{\underline{7 > -6}} \quad \text{True} \\
 & \text{all } \mathbb{R} \text{ numbers} \\
 & \begin{array}{c}
 \leftarrow \text{-----} \rightarrow \\
 -2 \ -1 \ 0 \ 1 \ 2 \ 3 \ 4
 \end{array}
 \end{aligned}$$

WHITE BOARD PRACTICE

$$5x - 7 > 2x + 3$$

$$\begin{array}{r} -2x \quad -2x \\ \hline 3x - 7 > 3 \\ \quad +7 \quad +7 \\ \hline \cancel{3x} > \frac{10}{3} \end{array}$$

$$x > \frac{10}{3}$$

WHITE BOARD PRACTICE

$$3(x - 2) < x + 6$$

$$\begin{array}{r} 3x - 6 < x + 6 \\ -x \quad -x \\ \hline 2x - 6 < 6 \\ \quad +6 \quad +6 \end{array}$$

$$\begin{array}{r} 2x < 12 \\ \hline 2 \quad 2 \\ x < 6 \end{array}$$

WHITE BOARD PRACTICE

$$3(x - 4) \leq 2x + 8 - 3x$$

$$4x \leq 20$$

$$\begin{array}{r} 3x - 12 \leq -x + 8 \\ +x \qquad \qquad +x \\ \hline \end{array}$$

$$x \leq 5$$

$$\begin{array}{r} 4x - 12 \leq 8 \\ +12 \qquad +12 \\ \hline \end{array}$$

WHITE BOARD PRACTICE

$$5(x + 3) \geq x - 4 + 4x$$

$$\begin{array}{r} \cancel{5x} + 15 \geq \cancel{5x} - 4 \\ -\cancel{5x} \qquad \qquad -\cancel{5x} \end{array} \quad \text{T}$$

$$15 \geq -4$$

all \mathbb{R} numbers

$$15 \leq -4 \quad \text{F}$$

no solution

WHITE BOARD PRACTICE

$$4x - 2(x + 3) \geq 2x - 4 + 3x$$

$$4x - 2x - 6 \geq 5x - 4$$

$$2x - 6 \geq 5x - 4$$

$$\begin{array}{r} -5x \qquad \qquad -5x \\ \hline \end{array}$$

$$\begin{array}{r} -3x - 6 \geq -4 \\ \quad +6 \qquad +6 \\ \hline \end{array}$$

$$\begin{array}{r} -3x \geq 2 \\ \hline -3 \qquad -3 \end{array}$$

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