

Solving Equations and Inequalities Review

Goal: Isolate the variable

Equations: Handle parentheses, move variables to one side, remove addition/subtraction, then multiplication/division.

- watch negatives; leave, change, opposite
- hidden 1

Inequalities: Follow the same rules for solving an equation with one exception

- if multiplying or dividing by a negative number, you must switch the symbol
- helpful to isolate the variable on the left for graphing

Three Types of Solutions for Equations

1) Only One Solution; $x = \underline{\hspace{2cm}}$

2) All #s are Solutions

3) No #s are Solutions

Solve.

1. $5(n - 3) = 3(n + 7)$

Solve.

$$1. 5(n - 3) = 3(n + 7)$$

$$\begin{array}{r} 5n - 15 = 3n + 21 \\ - 3n \quad - 3n \end{array}$$

$$\begin{array}{r} 2n - 15 = 21 \\ + 15 \quad + 15 \end{array}$$

$$2n = 36$$

$$n = 18$$

$$2. \quad 3(4x - 2) + 15 = 12x + 9$$

$$2. \quad 3(4x - 2) + 15 = 12x + 9$$

$$12x - 6 + 15 = 12x + 9$$

$$\begin{array}{r} 12x + 9 = 12x + 9 \\ -12x \qquad -12x \end{array}$$

$$9 = 9 \quad \text{Always true}$$

All #s are solutions

$$3. \quad 7y - 8 = 3(2y + 4) + y$$

$$3. 7y - 8 = 3(2y + 4) + y$$

$$7y - 8 = \underbrace{6y + 12}_{\text{green underline}} + \color{red}{1}y$$

$$\begin{array}{r} 7y - 8 = 7y + 12 \\ \color{green}{-7y} \quad \color{green}{-7y} \end{array}$$

$$-8 = 12 \quad \text{Never true}$$

No solutions

$$4. -2(3r + 4) = -5r - 8 - r$$

$$4. \quad -2(3r + 4) = \underbrace{-5r - 8 - r}$$

$$-6r + -8 = -6r - 8$$

$$\begin{array}{l} -5r - r \\ -5r + -1r \\ -6r \end{array}$$

$$-6r + -8 = -6r + -8 \quad \text{always true}$$

All #s are solutions

Solve, then graph.

$$5. -2(k + 1) > -16 + 5k$$

Solve, then graph.

$$5. \quad -2(k+1) > -16 + 5k$$

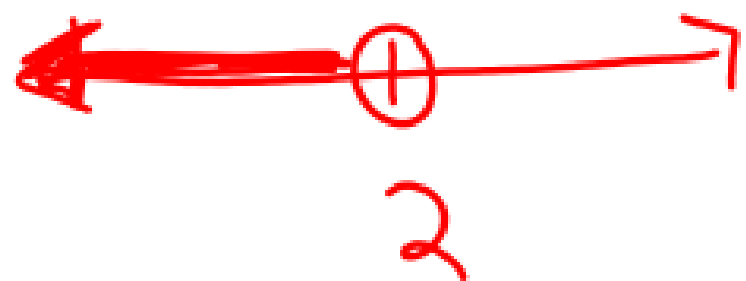
$$\begin{array}{r} -2k + -2 > -16 + 5k \\ -5k \qquad -5k \end{array}$$

$$\begin{array}{r} -7k + -2 > -16 \\ +2 \qquad +2 \end{array}$$

$$\frac{-7k}{-7} > \frac{-14}{-7}$$

$$k < 2$$

$$\begin{array}{r} 14 > 7k \\ 2 > k \end{array}$$



Solve, then graph.

$$6. \quad 2p + 5 \leq 3(p - 6)$$

Solve, then graph.

$$6. \quad 2p + 5 \leq 3(p - 6)$$

$$2p + 5 \leq 3p - 18$$

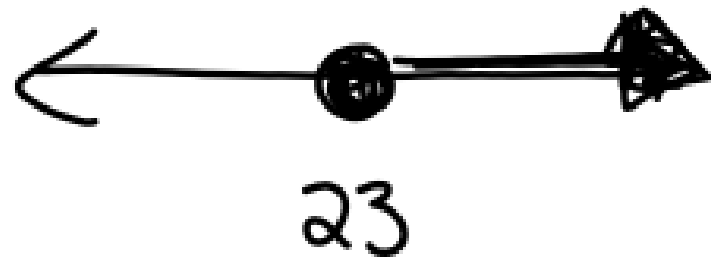
$-3p$ $-3p$

$$-1p + 5 \leq -18$$

-5 -5

$$\frac{-1p}{-1} \leq \frac{-23}{-1}$$

$$p \geq 23$$



Solve, then graph.

$$7. \quad 6 + \frac{1}{3} (y - 9) > 15$$

Solve, then graph.

$$7. 6 + \frac{1}{3}(y - 9) > 15$$

$$6 + \frac{1}{3}y - 3 > 15$$

$$\frac{1}{3}y + 3 > 15$$

-3 -3

$$\frac{3}{1} \cdot \frac{1}{3}y > \frac{12}{1} \cdot \frac{3}{1}$$

$$y > 36$$

