EQUATION HELPER

The key in equation solving is to isolate the variable, or to get the letter by itself. In one-step equations, we merely undo the operation - addition is the opposite of subtraction and multiplication is the opposite of division. In two-step equations, we must undo addition and subtraction first, then multiplication and division. Remember the golden rule of equation solving: If we do something to one side of the equation, we must do the exact same thing to the other side.

One-Step Addition and Subtraction Equations Examples

1. $x + 5 = 6$
   $-5 \quad -5$

   $x = 1$

   Check: $1 + 5 = 6$
   $6 = 6$

2. $t - 6 = 7$
   $+6 \quad +6$

   $t = 13$

   Check: $13 - 6 = 7$
   $7 = 7$

3. $g - 13 = 55$
   $+13 \quad +13$

   $g = 68$

   Check: $68 - 13 = 55$
   $55 = 55$

4. $5.1 = 2.3 + m$
   $-2.3 \quad -2.3$

   $2.8 = m$

   Check: $5.1 = 2.3 + 2.8$
   $5.1 = 5.1$

One-Step Multiplication and Division Equations Examples

1. $\frac{4x}{4} = \frac{16}{4}$

   $x = 4$

   Check: $4(4) = 16$
   $16 = 16$

2. $\frac{-4y}{-4} = \frac{20}{-4}$

   $y = -5$

   Check: $-4(-5) = 20$
   $20 = 20$

3. $-3 \bullet \frac{y}{-3} = 12 \bullet -3$

   $y = -36$

   Check: $-36 \div -3 = 12$
   $12 = 12$

4. $6 \bullet \frac{r}{6} = 12 \bullet 6$

   $r = 72$

   Check: $72 \div 6 = 12$
   $12 = 12$

Two-Step Equations Examples

1. $4x - 6 = -14$

$+6 \quad +6$

$\frac{4x}{4} = \frac{-8}{4}$

x = -2

Check: $4(-2) - 6 = -14$

$-8 - 6 = -14$

$-14 = -14$

2. $\frac{x}{-6} - 4 = -8$

$+4 \quad +4$

$-6 \bullet \frac{x}{-6} = -4 \bullet -6$

x = 24

Check: $(24/-6) - 4 = -8$

$-4 - 4 = -8$

$-8 = -8$

Inequalities

The process for solving an inequality is basically the same as solving within an equation. We still must "undo" operations with their opposite operation. The only exception is when we multiply or divide by a negative number (which is an eighth grade objective). When multiplying or dividing by a negative number, we must change the direction of the inequality (see examples below).

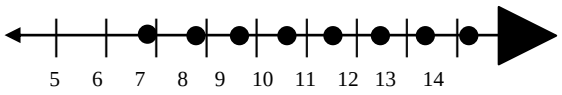
Roster - a list of elements in a set.
Rule - a general statement describing the set.
Graph - a line showing the set of all those points that satisfy the equation or inequality.
Solution Set - the set of numbers from the replacement set that satisfies the equation or inequality.

1. $\frac{4t}{4} > \frac{24}{4}$

$t > 6$ (Rule)

Roster: {7, 8, 9, ...}

Graph:



2. $b + -4 \geq 6$

$- -4 \quad - -4$ (Same as addition)

$b \geq 10$ (Rule)

Roster: {10, 11, 12, ... }

Graph: