

SOLVING EQUATIONS

The key in equation solving is to isolate the variable (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. 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.

$$\begin{array}{r} x+5=6 \\ -5 \quad -5 \\ \hline x=1 \end{array}$$

$$\begin{array}{r} 6* \frac{r}{6}=12 \quad *6 \\ \hline r=72 \end{array}$$

$$\begin{array}{r} \text{Check: } 1+5=6 \\ \quad \quad 6=6 \end{array}$$

$$\begin{array}{r} \text{Check: } 72 \div 6=12 \\ \quad \quad 12=12 \end{array}$$

In two step equations, we must undo addition and subtraction first, then multiplication and division (reverse PEMDAS!)

$$\begin{array}{r} 4x-6=-14 \\ +6 \quad +6 \\ \hline 4x=-8 \end{array}$$

$$\begin{array}{r} \frac{x}{-6}-4=-8 \\ +4 \quad +4 \\ \hline \end{array}$$

$$\begin{array}{r} \overline{4} \quad \overline{4} \\ x=-2 \end{array}$$

$$\begin{array}{r} -6* \frac{x}{-6}=-4 \quad *-6 \\ \hline x=24 \end{array}$$

When variables are on both sides of the equation, we must combine them first by adding or subtracting the amount of the variable on each side to have the variable on one side only. Then we must undo the addition and subtraction, then multiplication and division.

$$\begin{array}{r} 8x-6=4x+5 \\ -4x \quad -4x \\ \hline 4x-6=5 \\ +6 \quad +6 \\ \hline 4x=11 \end{array}$$

$$\begin{array}{r} \overline{4} \quad \overline{4} \\ x=\frac{11}{4}=2\frac{3}{4} \end{array}$$