

Intro to Vocabulary: Solving one, two, and multi-step equations

Remember, an expression is a mathematical "phrase" composed of terms, coefficients, and variables that stands for a single number. such as $3x + 1$ or $x^2 - 1$. We use Properties of Operations to simplify algebraic expressions. Expressions do NOT contain equal signs.

An Algebra Expression does NOT have an = sign

$$4n^2 + 7$$

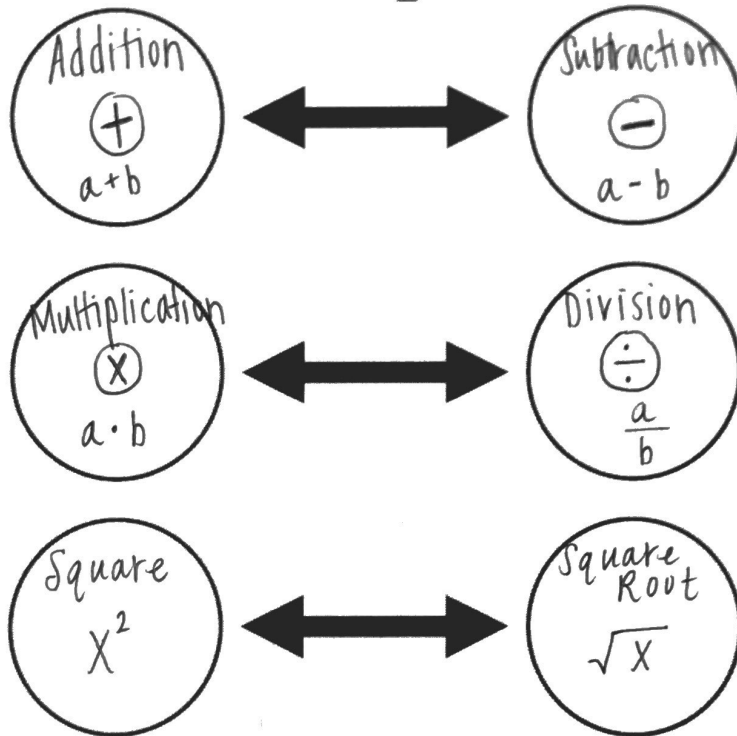
An equation is a mathematical "sentence" that says two expressions are equal to each other such as $3x + 1 = 5$. We use Properties of Equality (inverse operations) to solve algebraic equations. Equations contain equal signs.

An "Equation" does have an Equals sign

$$4n^2 + 7 = 11$$

When solving equations, you must perform inverse operations, which means you have to perform the operation opposite of what you see. You must also remember the operation you perform on one side of the equation must be performed to the other side.

Inverse Operations



Recognizing (+)

Positive Number by Itself
 $x + 3$ $3 + x$

Recognizing (-)

Term with a Negative sign in front
 $x - b$
 $-b + x$

Recognizing (x)

Number and Variable are side by side
 (bx)

When you first learned to solve equations in middle school, you might have used the word "cancel". We are no longer going to use the word "cancel". Take a look at the following examples:

$$\begin{array}{r} x - 120 = 80 \\ +120 \quad +120 \\ \hline x = 200 \end{array} \leftarrow \begin{array}{l} \text{Adding the opposite} \\ \text{Additive inverse} \\ \text{Adding to zero} \end{array}$$

$$\begin{array}{r} \frac{k}{2} = 16 \\ \frac{k}{\cancel{2}} \times \cancel{2} = 16 \times 2 \\ k = 32 \checkmark \end{array} \leftarrow \begin{array}{l} \text{Multiplying by the Reciprocal} \\ \text{Multiplicative Inverse} \\ \text{Divides/Multiplies to one} \end{array}$$

<u>Additive</u> Inverse	A number plus its inverse equals 0.	$a + -a = 0$	$7 + -7 = 0$
<u>Multiplicative</u> Inverse (Reciprocal)	A number times its reciprocal equals 1.	$a \cdot \frac{1}{a} = 1$	$3 \cdot \frac{1}{3} = 1$

When solving equations with more than one step, you still want to think about how you can "undo" the operations you see. Multi-step equations mean you might have to add, subtract, multiply, or divide all in one problem to isolate the variable. When solving multi-step equations, you are using inverse operations, which is like doing PEMDAS in reverse order or in other words "Don't Call Me After Midnight."

Solving Equations: Don't Call Me After Midnight

