One-Step and Two-Step Equations

Learning how to solve equations is the MOST FUNDAMENTAL concept you will get out of Algebra1

It is so important to have this concept down so you will be able to solve higher-level equations, make linear functions, do quadratics and so much more.

Pay extra attention to this lesson and the Multi-Step Equation lesson as they are super beneficial for you!

One-Step Equations:

One-Step equations typically involve doing 1 operation (adding, subtracting, multiplying, or dividing) to solve for the unknown in the equation. These are usually the easiest equations you will learn in Algebra 1.

1) $x + 12 = 25$

Since we want to solve for x, we have to isolate it or get it by itself. The only way to do that is to subtract 12 from both sides so all of the constants are on one side and all of the variables are on the other side.

$$x + 12 = 25$$
$$\underline{-12 \quad -12}$$
$$x \quad = 13$$

Let's try one more example using the other set of related operations (multiplication and division).

2) $5x = 35$

Remember we need to get x by itself so we need to do the opposite operation of what we see in the equation to get x by itself. In this case, 5 is being multiplied by x to get them together as 5x, so we need to divide by 5 to get x by itself

$$\frac{5x}{5} = \frac{35}{5} \quad \text{becomes} \quad x = 7$$

The key to solving one-step equations is to first figure out what operation is being shown in the equation (addition, subtraction, multiplication, or division) and do the OPPOSITE operation (meaning add if there is subtraction, subtract if there is addition, multiply if there is division and divide if there is the multiplication) to solve for the variable.

Two-Step Equations:

Two-Step equations are a little harder than one-step equations because 2 operations now have to be done in order to solve for x, but it is not difficult. Use the strategy of opposite operations from one-step equations and apply it twice for two-step equations.

Let's practice with a couple of examples.

1) $2x + 5 = 17$

A helpful tip when doing two-step equations is to always add/subtract first before doing multiplication/division so that we do not make the problem harder than it needs to be.

i) Let's subtract first!

$$2x+5=17$$
$$\underline{\quad -5 \quad -5}$$
$$2x = 12$$

ii) Then divide to get x by itself!

$$\frac{2x}{2} = \frac{12}{2}$$

$$x = 6$$

Let's do one more example to make sure we know the steps needed to be successful for solving these equations.

2) $\frac{x}{6} - 4 = 10$

i) Let's add first!

$$\frac{x}{6} - 4 = 10$$
$$\underline{+4 \quad +4}$$
$$\frac{x}{6} = 14$$

ii) Then multiply to get x by itself!

$$6 \cdot \frac{(x)}{(6)} = (14)\,6$$
$$x = 64$$

Keep practicing and you will become better at these equations!

Tips for Solving Problems:

1. Remember when you are solving one-step equations, you need to apply the opposite operation based on what you see. That is the only way you are going to get the variable you are solving for by itself.

2. Remember when you are solving two-step equations, you need to follow the same step that you do in one-step equations but twice. Always make sure to do addition/subtraction before multiplication/division to solve for your variable as it makes the equation way easier to solve.

3. You need to make sure you are able to solve these equations well as this is built on in later concepts in Algebra 1. Use the problems in this lesson and the quiz to ensure you have these skills down.