Chapter 36

SOLVING FOR

Often, we are not given a number to substitute for the variable. This is when we must "solve for the unknown," or "solve for X."



Solving an equation is like asking, which value makes this equation true?"

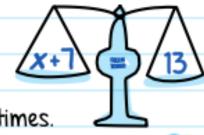


In order to do so, we must ISOLATE THE VARIABLE on one side of the equal sign.

EXAMPLE:
$$x + 7 = 13$$

In order to isolate the variable (x) on one side of the equal sign, we must:

1. Think of an equation as a scale, with the = sign as the middle. You must keep the scale balanced at all times.



- Ask yourself, "What is happening to this variable?"
 In this case, 7 is being added to the variable.
- 3. So, how do we get the variable alone? We use INVERSE OPERATIONS on both sides of the equation. What is the inverse of adding 7? Subtracting 7.

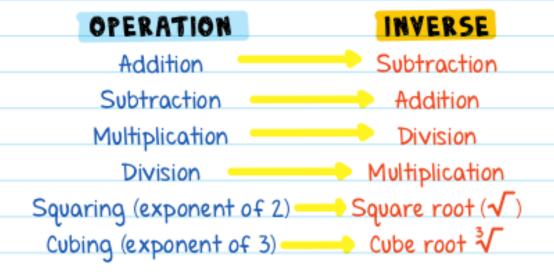
WHEN YOU SEE THE WORD INVERSE,
THINK ABOUT OPPOSITES!

(We subtract 7 from both sides to keep the equation balanced.)

CHECK YOUR WORK

$$x+7=13$$
 Check your work by $6+7=13$ plugging your answer into the original equation.

Inverse is just another word for opposite. Here's a quick rundown of all the operations and their inverse operations:



EXAMPLE:

Solve for m: m - 9 = -13.

m - 9 = -13

(What is happening to the m? The 9 is being subtracted from m. What is the inverse of subtraction? Addition!)

$$m = -4$$

CHECK YOUR WORK

$$m - 9 = -13$$

Plug your answer

$$(m = -4)$$
 into the

original equation.

EXAMPLE: Solve for t: -3t = 39.

$$-3t = 39$$

(What is the inverse of multiplication?

Division.)

Don't forget that in order to keep the equation balanced, whatever you do to one side, you MUST also do to the other side.

CHECK YOUR WORK

$$3t = 39$$

$$-3(-13) = 39$$

EXAMPLE: Solve for $y = \frac{y}{4} = -19$.

$$\frac{y}{4} = -19$$

(What is the inverse of division? Multiplication.)

$$\frac{A}{1} \times \frac{y}{4} = -19 \times 4$$

CHECK YOUR WORK

$$\frac{y}{4} = -19$$

$$\frac{-76}{4} = -19$$

EXAMPLE:

Solve for $g: g^2 = 121$.

and

$$g^2 = 121$$
 $\sqrt{g^2} = \sqrt{12}1$

(What is the inverse of squaring? Finding the square root.)

$$g = \pm 11$$

CHECK YOUR WORK

$$g^2 = 121$$

$$g^2 = 12$$

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CHECK YOUR KNOWLEDGE

Solve for each variable.

2.
$$7x = -35$$

$$x - 11 = 8$$

7.
$$-74 = -2w$$

$$\frac{V}{7} = -6$$

$$\frac{x}{-12} = -14$$

CHECK YOUR AUSWERS





$$y = 5$$

$$m = -8$$

10.
$$h = \pm 13$$