

# Simple equations

To solve simple equations, start by thinking about what's happening to the variable. Consider  $x + 5 = 12$ . What's happening to  $x$ ? 5 is being added to it.

Well what's the inverse operation of addition? How do you “undo” addition of 5? Since the inverse operation of addition is subtraction, you'll subtract 5 from both sides to undo the addition of 5.

Solving simple equations is really just undoing everything that's happening to the variable in order to get the variable by itself. Solve by working backwards from the order of operations (undo all addition/subtraction first, and then undo multiplication/division). Use inverse operations until the variable is alone, and always remember to do the same thing to both sides of the equation so that it stays balanced.

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## Example

Solve for the variable.

$$x - 3 = 10$$

In this example, 3 is being subtracted from  $x$ . To undo that subtraction, we need to add 3 to both sides of the equation.

$$x - 3 + 3 = 10 + 3$$

$$x + 0 = 13$$



Remember that 0 can be added or subtracted from anything and it won't change the value. Which means that  $x + 0$  really just equals  $x$ .

$$x + 0 = 13$$

$$x = 13$$

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Let's try another example of solving simple equations.

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### Example

Solve for the variable.

$$3x + 5 = 11$$

In this example,  $x$  is being multiplied by 3 and then 5 is being added to the result. To solve, we work backwards from the order of operations, so we need to first undo the addition by subtracting 5 from both sides of the equation.

$$3x + 5 - 5 = 11 - 5$$

$$3x + 0 = 6$$

$$3x = 6$$

Now we need to undo the multiplication by 3. Division is the inverse operation of multiplication, so we will divide both sides by 3.



$$\frac{3x}{3} = \frac{6}{3}$$

$$x = 2$$

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