Grade 6 · One-Step Equations · Lesson

Common Core 6.EE.B.5, 6.EE.B.6, 6.EE.B.7 · mathovore.fr

> An equation is a statement that two expressions are equal, such as $x+7=19$. A solution is a value of the variable that makes the equation true. To solve a one-step equation, use the inverse operation on both sides: subtract to undo addition, and divide to undo multiplication. Then check by substituting.

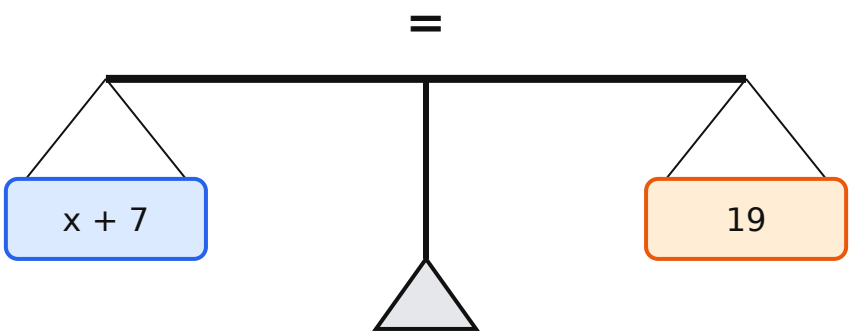
Grade 6Common Core: 6.EE.B.5 · 6.EE.B.6 · 6.EE.B.7

> **Key facts:**
>
> - A solution makes the equation true when substituted: $x=12$ solves $x+7=19$.
> - To solve $x+p=q$, subtract p from both sides: $x=q-p$.
> - To solve $px=q$, divide both sides by p: $x=q\div p$.
> - Equations can use whole numbers, fractions, and decimals, and the same steps still work.

What is an equation and what is a solution?

An equation is a statement that two expressions are equal, such as $x+7=19$. It has an equals sign, so it can be true or false. A **solution** is a value of the variable that makes the equation true. Here $x=12$ is a solution because $12+7=19$, but $x=10$ is not, because $10+7=17$.

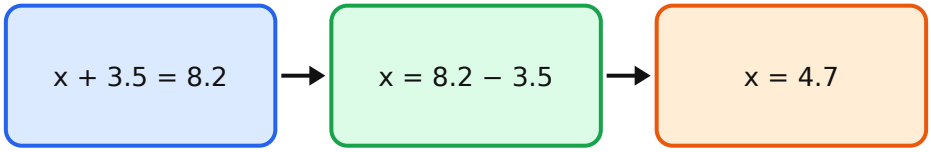
Solving an equation
To **solve** an equation, get the variable alone on one side. Use an **inverse operation**, which undoes another operation: subtraction undoes addition, and division undoes multiplication. Whatever you do to one side, do to the other side, so the equation stays balanced.



Both sides are equal when $x = 12$.

How do you solve an equation like $x + p = q$?

The variable has p added to it. Subtract p from both sides. For $x + 3.5 = 8.2$, subtract 3.5: $x = 8.2 - 3.5 = 4.7$.

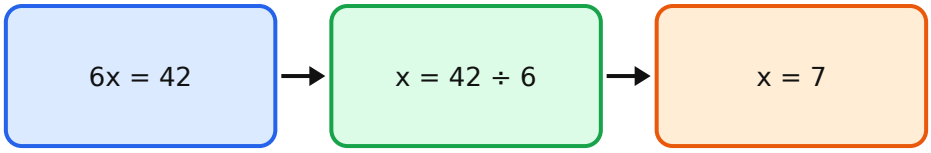


Subtract to undo addition.

How do you solve an equation like $px = q$?

The variable is multiplied by p. Divide both sides by p. For $6x = 42$, divide by 6: $x = 7$. The numbers can be fractions or decimals: for $0.6x = 4.2$, $x = 4.2 \div 0.6 = 7$.

Equation form	Inverse operation	Example
$x + p = q$	subtract p from both sides	$x + 9 = 21$, so $x = 12$
$px = q$	divide both sides by p	$5x = 45$, so $x = 9$



Divide to undo multiplication.

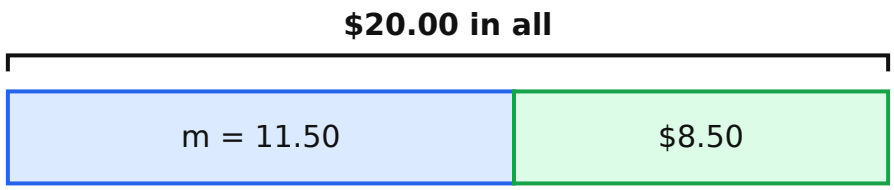
How do you write and solve an equation from a word problem?

Example: Priya had some money. After she earned $8.50 at the school store, she had $20. How much did she have at first?

1. Choose a variable: let m be the dollars she had at first.
2. Write an equation that matches the story: $m+8.50=20$.
3. Subtract 8.50 from both sides: $m=20-8.50=11.50$.
4. Check by substituting: $11.50+8.50=20$, which is true.

Priya had $11.50 at first. Always state the answer with its units, and make sure it fits the story.

Substitution is also a quick test. To see whether $x=4$ solves $3x=15$, replace x with 4: $3\times4=12$, and $12\neq15$, so 4 is not a solution.



$m+8.50=20.00$.

One-Step Equations: frequently asked questions

What does it mean to solve an equation?

Solving an equation means finding the value of the variable that makes the equation true. For $x+4=10$, the solution is $x=6$ because $6+4=10$.

What is an inverse operation?

An inverse operation undoes another operation. Subtraction undoes addition, and division undoes multiplication. You use the inverse operation on both sides of an equation to get the variable alone.

Why do you do the same thing to both sides?

An equation is like a balanced scale. If you subtract or divide on only one side, the two sides are no longer equal. Doing the same operation to both sides keeps the equation true.

How do you check a solution?

Substitute the value for the variable and see if both sides match. For $5x=45$ and $x=9$, compute $5\times9=45$, so the solution is correct.

How do you write an equation from a word problem?

Pick a variable for the unknown amount, then translate the story into an equation using the operation it describes. A total after earning more money becomes an addition equation, like

$m+8.50=20.$