



# Truth and Equations

Let's see what it means to find a solution for an equation with a variable.

## 2.1 Notice and Wonder: Equations

What do you notice? What do you wonder?

$$3 \cdot 6 = 18$$

$$3 \cdot x = 18$$

$$3x = 18$$

$$18 = 3x$$

## 2.2 Three Letters

1. The equation  $a + b = c$  could be true or false.
  - a. If  $a$  is 3,  $b$  is 4, and  $c$  is 5, is the equation true or false?
  
  
  
  
  
  
  
  
  
  
  - b. Find new values of  $a$ ,  $b$ , and  $c$  that make the equation true.
  
  
  
  
  
  
  
  
  
  
  - c. Find new values of  $a$ ,  $b$ , and  $c$  that make the equation false.
  
2. The equation  $x \cdot y = z$  could be true or false.
  - a. If  $x$  is 3,  $y$  is 4, and  $z$  is 12, is the equation true or false?
  
  
  
  
  
  
  
  
  
  
  - b. Find new values of  $x$ ,  $y$ , and  $z$  that make the equation true.
  
  
  
  
  
  
  
  
  
  
  - c. Find new values of  $x$ ,  $y$ , and  $z$  that make the equation false.



## 2.3 Find a Solution

Here are some equations that contain a **variable** and a list of values. Think about what each equation means and find a **solution** in the list of values. If you get stuck, consider drawing a diagram. Be prepared to explain your reasoning.

1.  $1000 - a = 400$

2.  $8c = 8$

3.  $10w = 1$

4.  $10 = \frac{1}{2}f$

5.  $0.99 = 1 - g$

List:  $\frac{1}{8}$     $\frac{3}{7}$     $\frac{4}{7}$     $\frac{3}{5}$     $\frac{5}{3}$     $\frac{7}{3}$    0.01   0.1   0.5  
1   2   8.5   9.5   16.7   20   400   600   1400



## Are you ready for more?

One solution to the equation  $a + b + c = 10$  is  $a = 2, b = 4, c = 4$ .

How many different whole-number solutions are there to the equation  $a + b + c = 10$ ? Explain or show your reasoning.

## Lesson 2 Summary

An equation can be true or false. An example of a true equation is  $7 + 1 = 4 \cdot 2$ . An example of a false equation is  $7 + 1 = 9$ .

An equation can have a letter in it to represent a value, for example,  $u + 1 = 8$ . This equation is false if  $u$  is 3, because  $3 + 1$  does not equal 8. This equation is true if  $u$  is 7, because  $7 + 1 = 8$ .

A letter in an equation that represents an unknown value is called a **variable**. In  $u + 1 = 8$ , the variable is  $u$ . A number that can be used in place of the variable that makes the equation true is called a **solution** to the equation. In  $u + 1 = 8$ , the solution is 7.

When a number is written next to a variable, it means the number and the variable are being multiplied. For example,  $7x = 21$  means the same thing as  $7 \cdot x = 21$ . A number written next to a variable is called a **coefficient**. If no coefficient is written, the coefficient is 1. For example, in the equation  $p + 3 = 5$ , the coefficient of  $p$  is 1.