Unit 4, Lesson 2

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?

$$3 \cdot 6 = 18$$

$$3 \cdot x = 18$$

$$3x = 18$$

$$18 = 3x$$

 CC BY NC Illustrative Mathematics, based on IM 6–8 Math, CC BY Open Up Resources.

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.

 CC BY NC Illustrative Mathematics, based on IM 6–8 Math, CC BY Open Up Resources.

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

 CC BY NC Illustrative Mathematics, based on IM 6–8 Math, CC BY Open Up Resources.

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.

CC BY NC Illustrative Mathematics, based on IM 6–8 Math, CC BY Open Up Resources.