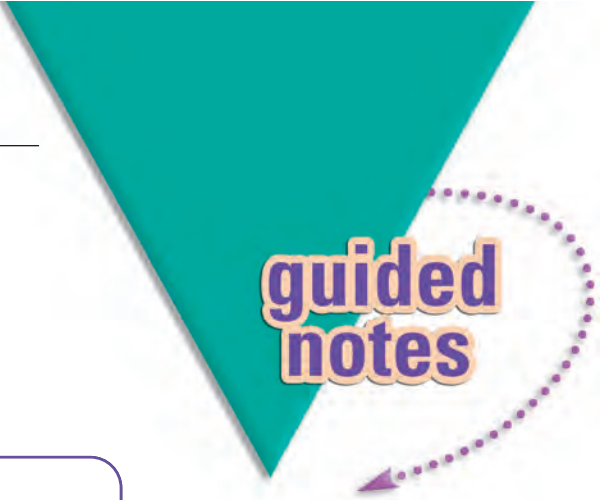


NAME \_\_\_\_\_

**Module 3** Solving Linear Equations  
of One Variable

**Lesson 1** Identifying Properties of Equality



guided  
notes

### Lesson Objectives

- Recognize and use the Reflexive, Symmetric, and Transitive Properties of Equality.
- Recognize and use the Addition, Subtraction, Multiplication, and Division Properties of Equality.
- Supply the reasons for an algebraic proof when solving a simple equation.

**Equality** \_\_\_\_\_ describes a relationship between the values on either side of an equation. The value on one side is equal to the value on the other side.

The **Reflexive** \_\_\_\_\_ Property of Equality states that for any real number  $a$ ,  $a = a$ . For example, this property is used to say that  $5 = \underline{5}$ .

The **Symmetric** \_\_\_\_\_ Property of Equality allows us to say that if  $x = 6$ , then  $6 = x$ . More formally, for all real numbers  $a$  and  $b$ , if  $a = b$ , then  $\underline{b = a}$ .

**1** Name the property of equality shown below.

For any real number  $d$ ,  $d = d$ . **Reflexive** \_\_\_\_\_ Property of Equality

The **Transitive** \_\_\_\_\_ Property of Equality states that for all real numbers  $a$ ,  $b$ , and  $c$ , if  $a = b$ , and  $b = c$ , then  $\underline{a = c}$ . For example, if

Newt's age = Roxie's age, and Roxie's age = Lizzie's age, then

**Newt's** \_\_\_\_\_ age = **Lizzie's** \_\_\_\_\_ age.

**2** If  $x = 9$  and  $9 = y$ , then  $\underline{x = y}$ . Transitive Property of Equality

The **Addition** Property of Equality says that if equals are added to equals, then the results are equal. In other words, for all real numbers  $a$ ,  $b$ , and  $c$ , if  $a = b$ , then  $a + c = b + c$ .

The **Subtraction** Property of Equality says that if equals are subtracted from equals, then the results are equal. In other words, for all real numbers  $a$ ,  $b$ , and  $c$ , if  $a = b$ , then  $a - c = b - c$ .

The **Multiplication** Property of Equality says that if equals are multiplied by equals, then the results are equal. In other words, for all real numbers  $a$ ,  $b$ , and  $c$ , if  $a = b$ , then  $ac = bc$ .

The **Division** Property of Equality says that if equals are divided by nonzero equals, then the results are equal.

- 3 Using the language of algebra, state the Division Property of Equality.  
**For all real numbers  $a$ ,  $b$ , and  $c$ , with  $c \neq 0$ , if  $a = b$ , then  $\frac{a}{c} = \frac{b}{c}$ .**

Statements	Reasons
$2x - 10 = 4$	Given
$2x = 14$	<b>Addition Property of Equality</b>
$x = 7$	<b>Division Property of Equality</b>

Statements	Reasons
$\frac{x}{3} + 5 = 9$	Given
$\frac{x}{3} = 4$	<b>Subtraction Property of Equality</b>
$x = 12$	<b>Multiplication Property of Equality</b>

- 4 Which Property of Equality is used on the equation  $3x - 5 = 1$  to get the equation  $3x = 6$ ? **Addition Property of Equality**