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 $5 =$ **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 **$b = a$**.

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 **$a = c$**. 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 **$x = y$**. 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
$2x = 14$	**Addition Property of Equality**
$x = 7$	**Division Property of Equality**

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

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