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Variables and Equations

Unit 2 Lesson 4

VARIABLES AND EQUATIONS

Students will be able to:

Understand the definitions of a variable and an equation
and write an equation from a sentence

Key Vocabulary:

- Variable
- Equation
- True, False, Open Equation
- Solution of an Equation
- Write Equation from Sentence

VARIABLES AND EQUATIONS

Variable

A variable is a symbol for a number whose value is to be found or is to known yet

Examples:

- $3x + 4$ has x as variable
- $2y - 5 + 4y$ has y as variable

VARIABLES AND EQUATIONS

An **Equation** is a mathematical sentence that uses an equal sign ($=$). It can be used to represent the relationship between two quantities that have the same value.

Types of Equations

1. True Equation

If the expressions on either side of the equal sign are equal, it is a true equation.

Examples

- $1 + 9 = 10$
- $10 + 2 = 8 + 4$

VARIABLES AND EQUATIONS

2. False Equation

If the expressions on either side of the equal sign are not equal, it is a false equation.

Examples

- $2 + 8 = 11$
- $11 + 2 = 9 + 5$

3. Open Equation

If the equation contains one or more variables, and maybe a true or a false depending on the values of its variables, it is an open equation.

Examples

- $x + 5 = 6$
- $2x - 6 = 3y$

VARIABLES AND EQUATIONS

Problem 1: Tell whether each equation is true, false, or open.

Explain.

A. $12 + 18 = 15 + 15$

B. $5 \cdot 7 = 34$

C. $3x + 12 = 48$

VARIABLES AND EQUATIONS

Problem 1: Tell whether each equation is true, false, or open.
Explain.

A. $12 + 18 = 15 + 15$

True $30 = 30$

B. $5 \cdot 7 = 34$

False $35 = 34$

C. $3x + 12 = 48$

Open Variable x

VARIABLES AND EQUATIONS

Solution of an Equation

The solution of an equation containing a variable is a value of the variable that makes the equation true.

VARIABLES AND EQUATIONS

Problem 2: Tell whether the given number is a solution of each equation.

A. Is $x = 6$ a solution of the equation $x - 14 = 5$?

B. Is $y = \frac{1}{2}$ a solution of the equation $4y + 2 = 10$?



VARIABLES AND EQUATIONS

Problem 2: Tell whether the given number is a solution of each equation.

A. Is $x = 6$ a solution of the equation $x - 14 = 5$?

$$x = 14 + 5$$

$$x = 19$$

$$x = 6 \text{ not a solution}$$

B. Is $y = \frac{1}{2}$ a solution of the equation $4y + 2 = 10$?

$$4y = 10 - 2$$

$$4y = 8y = 2$$

$$y = \frac{1}{2} \text{ not a solution}$$

VARIABLES AND EQUATIONS

Translation Sentences to Equations

1. Use variables to represent the unspecified numbers or measures referred to in the sentence or problem.
2. Write the verbal expressions as algebraic expressions.

Verbal Expressions that suggest the **equals sign**:

is equal to

is

is as much as

equals

is the same as

is identical to



VARIABLES AND EQUATIONS

Problem 3: Write an equation for each sentence.

A. Fifteen times the number a is equal to four times the sum of b and c .

B. Three times x subtracted from 57 equals 29.

C. The difference of 10 and a number is 5.

VARIABLES AND EQUATIONS

Problem 3: Write an equation for each sentence.

A. Fifteen times the number a is equal to four times the sum of b and c .

$$15 \cdot a = 4(b + c)$$

B. Three times x subtracted from 57 equals 29.

$$57 - 3x = 29$$

C. The difference of 10 and a number is 5.

$$10 - x = 5$$