Lesson 11

NAME:

Evaluating Expressions/Substitution

Start by navigating to the Online Lesson for instructions.

Objectives

- Simplify using order of operations, including expressions containing absolute value and exponents
- Simplify an expression with terms to the second or third power
- Evaluate an expression using substitution
- Use substitution, this includes checking a solution to a single variable equation

Why?

We use substitution to see what an expression equals when we substitute real numbers for the variables. It helps us test and understand formulas — like finding total cost, distance, or area. Substitution shows how letters in math stand for real numbers, making it possible to solve problems. This skill helps you make sure your math is accurate and connects what you're doing to real-world problems.

Explore

Evaluating Expressions/Substitution

Fill in the notes as you watch the video in the Online Lesson.

- Use order of operations when _____ expressions.
  - In math, evaluating means to _____ the value of something.
- Evaluating is often used when an expression contains a _____.
  - If you know the value of a variable, evaluate the expression by _____ that value into the expression wherever that variable is.
  - Then, use order of operations to _____ the expression and determine its final value.

Example 1

Complete the example as you watch the video in the Online Lesson.

Evaluate the expression when $a = 1, b = 2, c = 3, d = 4$.

$$-a^2 + \frac{bc}{d}$$

Implement

Explain

- Substitute all known values of the variables
- Simplify using order of operations

Example 2

Complete the example as you watch the video in the Online Lesson.

Evaluate the expression when $x = 3, y = 12, z = -2$.

$$xyz - x + y \div z^2$$

Implement

Explain

- Substitute all known values of the variables
- Simplify using order of operations

Example 3

Complete the example as you watch the video in the Online Lesson.

Determine which value of x makes the equation true.

$\frac{2}{3}x - 6 = 5$ when $x = 3$ or $x = \frac{33}{2}$

Implement

Explain

- Substitute in the value for x
- Simplify the left side of the expression

- When both sides are equal you have found the correct solution to the equation

Practice

Evaluate the expressions using $x = -1, y = -2$

1) $2xy^2 + 3x^3y$

2) $-3y + 7x - xy$

Evaluate the expression using $a = 5, b = 15$

3) $-ab + \frac{b}{a}$

4) $-\frac{1}{3}b + a$

Evaluate the expressions using $x = 2, y = -3$

5) $\frac{1}{4}x^2(xy)^2$

6) $\frac{4}{xy} \div x^2y$

Evaluate the expressions using $a = 4$, $b = 5$, $c = -1$

7) $ab + bc$

8) $\frac{b}{a} - \frac{c}{a}$

Determine which value is true for the equation.

9) $-3x + 16 = 43$ when $x = 9$ or $x = -9$

10) $\frac{x}{4} - 7 = -11$ when $x = -16$ or $x = 1$

11) $\frac{5}{2}(3x + 2) = 9$ when $x = \frac{8}{15}$ or $x = 30$

12) $12 - 7x = -2$ when $x = -2$ or $x = 2$

To continue, return to the Online Lesson.