7 Evaluate Expressions

Key Words

algebraic expression
numeric expression

An expression that has a symbol or variable is an **algebraic expression**.
An expression that does not have a symbol or variable is a **numeric expression**.

To evaluate a numeric expression, follow the order of operations. The order of operations states that all operations within parentheses are solved first, followed by exponents. Multiplication and division are then solved from left to right. Finally, addition and subtraction are solved from left to right.

You can evaluate an algebraic expression by substituting a number for the variable or symbol. Then evaluate the expression as a numeric expression.

Example 1

Evaluate: $3^2 + 3 \times 2 - 1$

$3^2 + 3 \times 2 - 1$	Use the order of operations.
$\mathbf{9} + 3 \times 2 - 1$	Evaluate any exponents.
$9 + \mathbf{6} - 1$	Multiply/divide from left to right.
$\mathbf{15} - 1$	Add/subtract from left to right.
$\mathbf{14}$	Add/subtract from left to right.

$3^2 + 3 \times 2 - 1 = 14$

Example 2

The perimeter of a rectangle is determined using the formula $P = 2l + 2w$, where P = perimeter, l = length, and w = width. The length of a rectangular park is 40 meters, and its width is 25 meters. What is the perimeter of the park?

Substitute 40 for l and 25 for w into the formula. Then evaluate as a numeric expression.

$P = 2l + 2w$

$P = 2(40) + 2(25)$	Substitute 40 for l and 25 for w.
$P = 80 + 50$	Multiply/divide from left to right.
$P = 130$	Add.

The perimeter of the park is 130 meters.

RECALL

Write the order of the operations you would use to evaluate this expression:
$4 + (23 - 5) \div 3^2 \times 2$

Guided Practice

Evaluate: $4 \times 7 \div (5 + 9) - 1^2$

Step 1 Determine the order of operations to use for this expression.

The first operation to use to solve is _____.

$4 \times 7 \div (5 + 9) - 1^2$

$4 \times 7 \div$ _____ $- 1^2$

REMEMBER

Solve one operation at a time. Then rewrite the new expression.

Step 2 Determine the second operation to use.

The second operation to use to solve is _____.

$4 \times 7 \div 14 - 1^2$

$4 \times 7 \div 14 -$ _____

Step 3 Determine the third operation to use.

The third operation to use to solve is _____.

$4 \times 7 \div 14 - 1$

_____

Step 4 Determine the fourth operation to use.

The fourth operation to use to solve is _____.

$28 \div 14 - 1$

_____

Step 5 Determine the fifth operation to use.

The fifth operation to use to solve is _____.

Complete the evaluation: _____

$4 \times 7 \div (5 + 9) - 1^2 =$ _____