



PreAlgebraCoach.com

Writing and Evaluating Expressions

Unit 1 Lesson 4

Writing and Evaluating Expressions

Students will be able to:

Write and evaluate expressions

Key Vocabulary:

An algebraic expression

Addition

Subtraction

Multiplication

Division

Writing Expressions

- Word problems use expressions that you can write with symbols. An algebraic expression has at least one variable.
- A variable is a letter or symbol that represents one or more numbers.
- Writing algebraic expressions for words helps you solve word problems.

Writing and Evaluating Expressions

- To translate a verbal phrase into an algebraic expression, the first step is to define a variable.
- When you define a variable, you choose a variable to represent an unknown quantity.
- Always look for the placement of commas in the verbal statements. They will help you decide how to properly group terms in your algebraic expression.

Writing and Evaluating Expressions

- There are several different ways to describe expressions with words.

Operation	Addition +	Subtraction —	Multiplication *	Division ÷	Power
Words	<ul style="list-style-type: none">added toplussummore thanincreased by	<ul style="list-style-type: none">subtracted fromminusdifferenceless thandecreased bytake awaytaken from	<ul style="list-style-type: none">timesmultiplied byproductgroups of	<ul style="list-style-type: none">divided bydivided intoquotient	<ul style="list-style-type: none">square of; squaredthe cube of; cubed

Sample Problem 1: Write an algebraic expression for the word expression.

- a. 12 divided by the sum of x and 2

Sample Problem 1: Write an algebraic expression for the word expression.

- a. 12 **divided by** the **sum** of x and 2

$$12 \div (x + 2)$$

Sample Problem 1: Write an algebraic expression for the word expression.

b. 9 more than 2 multiplied by z

Sample Problem 1: Write an algebraic expression for the word expression.

b. 9 more than 2 multiplied by z

$$9 + 2 * z \quad \text{or} \quad 9 + 2z$$

Sample Problem 1: Write an algebraic expression for the word expression.

- c. The sum of 6 multiplied by a and 8 multiplied by b

Sample Problem 1: Write an algebraic expression for the word expression.

- c. The **sum** of 6 multiplied by a and 8 multiplied by b

$$6 * a + 8 * b \quad \text{or} \quad 6a + 8b$$

Sample Problem 1: Write an algebraic expression for the word expression.

d. 14 more than the difference of x and y

Sample Problem 1: Write an algebraic expression for the word expression.

d. 14 more than the difference of x and y

$$14 + (x - y)$$

Sample Problem 1: Write an algebraic expression for the word expression.

- e. The quotient of m and 7 decreased by 10

Sample Problem 1: Write an algebraic expression for the word expression.

- e. The **quotient of m** and **7** **decreased by 10**

$$\frac{m}{7} - 10 \quad \text{or} \quad m \div 7 - 10$$

Sample Problem 1: Write an algebraic expression for the word expression.

- f. 5 times, a number increased by 6

Sample Problem 1: Write an algebraic expression for the word expression.

f. 5 times, a number increased by 6

$$5 * (x + 6)$$

Sample Problem 2: Write an expression to match the words.

- a. If a car traveled for 6 hours at an average rate of r kilometers per hour, represent the distance it traveled.

Sample Problem 2: Write an expression to match the words.

- a. If a car traveled for 6 hours at an average rate of r kilometers per hour, represent the distance it traveled.

$$r = \text{an average rate} \left(\frac{\text{km}}{\text{h}} \right)$$

$$\text{Distance (km)} \quad 6 * r$$

Sample Problem 2: Write an expression to match the words.

- b.** Represent the total number of days in x weeks and 5 days.

Sample Problem 2: Write an expression to match the words.

- b. Represent the total number of days in x weeks and 5 days.

x – number of weeks

Every week has 7 days

Total number of days

$$7x + 5$$

Sample Problem 2: Write an expression to match the words.

- c. After 12 centimeters had been cut from a piece of lumber, y centimeters were left. Represent the length of the original piece of lumber.

Sample Problem 2: Write an expression to match the words.

- c. After 12 centimeters had been cut from a piece of lumber, y centimeters were left. Represent the length of the original piece of lumber.

y – length of piece (cm)

Length of original piece (cm) $12 + y$

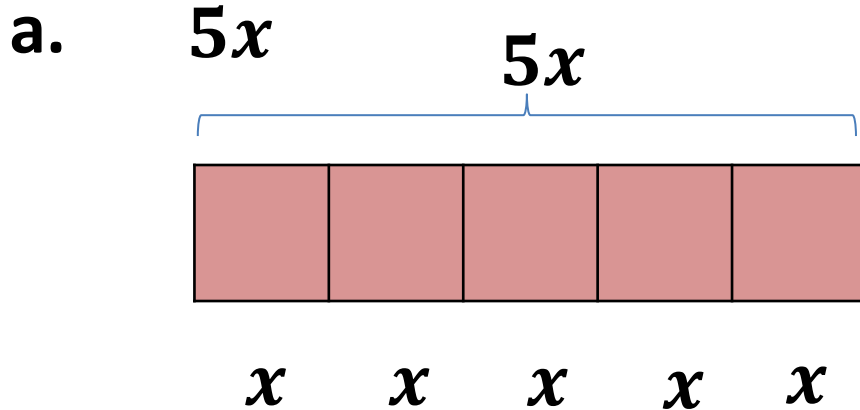
Modeling Algebraic Expressions

- Algebraic expressions can also be represented with models.

Sample Problem 3: Use a bar model to represent each expression.

a. $5x$

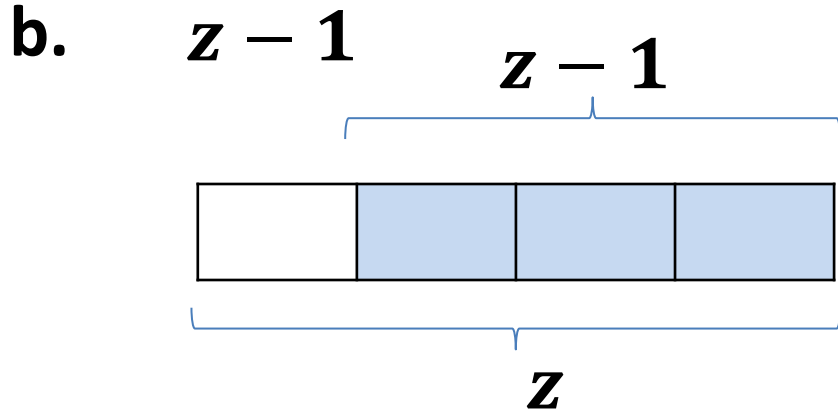
Sample Problem 3: Use a bar model to represent each expression.



Sample Problem 3: Use a bar model to represent each expression.

b. $z - 1$

Sample Problem 3: Use a bar model to represent each expression.



Evaluating Expressions

To evaluate an expression follow these steps:

1. Substitute the value for the variable.
2. Then find the value of the expression following the order of operations.

Sample Problem 4: Evaluate each of the following expressions when $x = 3$ and $y = 5$.

a. $3x^2 - (2x + y) =$

Writing and Evaluating Expressions

Sample Problem 4: Evaluate each of the following expressions when $x = 3$ and $y = 5$.

$$\begin{aligned} \text{a. } & 3x^2 - (2x + y) = \\ & = 3 * 3^2 - (2 * 3 + 5) = \\ & = 3 * 9 - (6 + 5) = \\ & = 27 - 11 = \\ & = 16 \end{aligned}$$

Sample Problem 4: Evaluate each of the following expressions when $x = 3$ and $y = 5$.

b. $(3x - y)^2 + 2xy =$

Sample Problem 4: Evaluate each of the following expressions when $x = 3$ and $y = 5$.

$$\begin{aligned}\text{b. } & (3x - y)^2 + 2xy = \\ & = (3 * 3 - 5)^2 + 2 * 3 * 5 = \\ & = (9 - 5)^2 + 6 * 5 = \\ & = 4^2 + 30 = \\ & = 16 + 30 = 46\end{aligned}$$

Sample Problem 4: Evaluate each of the following expressions when $x = 3$ and $y = 5$.

c. $2\left(\frac{3x}{9} + 2x - y\right) =$

Writing and Evaluating Expressions

Sample Problem 4: Evaluate each of the following expressions when $x = 3$ and $y = 5$.

$$\begin{aligned} \text{c. } & 2\left(\frac{3x}{9} + 2x - y\right) = \\ & = 2\left(\frac{3 * 3}{9} + 2 * 3 - 5\right) = \\ & = 2 * \left(\frac{9}{9} + 6 - 5\right) = \\ & = 2 * (1 + 6 - 5) = \\ & = 2 * (7 - 5) = 2 * 2 = 4 \end{aligned}$$