



## Vocabulary

### Review

Simplify each numerical expression.

1.  $6(5 - 2) + 7 =$

2.  $\frac{7 + 5 \cdot (-3)}{4} =$

3.  $(-5)^2 - (4)^2 =$

### Vocabulary Builder

**evaluate** (noun) ee VAL you ayt

**Definition:** To **evaluate** an expression means to substitute a number for each variable and then simplify to get a value.

**Example:** To **evaluate**  $xy$  for  $x = 2$  and  $y = 3$ , substitute 2 for  $x$  and 3 for  $y$ ;  
 $xy = (2)(3) = 6$ .

### Use Your Vocabulary

Evaluate each expression for the given values of the variables.

4.  $a + \frac{b}{4}$  for  $a = -2$  and  $b = 8$

5.  $x - x^2y$  for  $x = 3$  and  $y = -4$

Take note

### Key Concept Properties for Simplifying Algebraic Expressions

6. Draw a line from each property in Column A to an algebraic example of the property in Column B. Let  $a$ ,  $b$ , and  $c$  represent real numbers.

#### Column A

Distributive Property for Subtraction

Multiplication by 0

Multiplication by  $-1$

Opposite of a Sum

Opposite of a Difference

Opposite of an Opposite

#### Column B

$$-(a + b) = -a + (-b) = -a - b$$

$$-(-a) = a$$

$$-1 \cdot a = -a$$

$$a(b - c) = ab - ac$$

$$0 \cdot a = 0$$

$$-(a - b) = -a + b = b - a$$



## Problem 1 Modeling Words With Algebraic Expressions

**Got It?** Which algebraic expression models the word phrase *two times the sum of  $a$  and  $b$* ?

7. The word “times” means you should use multiplication / addition / division.
8. The word “sum” means you should use multiplication / addition / division.
9. Now write the expression.

Complete each numerical or algebraic expression by writing a letter, number or operation sign in each box.

10. The difference of 7 and 4. 7   4
11. The product of 3 and  $x$ . 3    $x$
12. The number  $y$  increased by 2.  $y$
13. The quotient of 48 and 3. 48   3
14. The number  $t$  is doubled then decreased by 1.    $t$    1
15. Five taken away from  $q$ .    $-$



## Problem 2 Modeling a Situation

**Got It?** You had \$150, but you are spending \$2 each day. What algebraic expression models this situation?

16. Define the variable. Let  $d =$  .
17. Complete the model to write the algebraic expression.

Relate Starting amount  $-$  the amount spent per day  $\cdot$  the number of days

Write    $-$     $\cdot$   

18. Now write the expression.



## Problem 3 Evaluating Algebraic Expressions

**Got It?** What is the value of the expression  $\frac{2(x^2 - y^2)}{3}$  for  $x = 6$  and  $y = -3$ ?

19. Substitute the given values for each variable into the expression.

$$\frac{2(x^2 - y^2)}{3} = \frac{2(\text{ }^2 - \text{ }^2)}{3}$$

20. Now simplify the numerical expression.



#### Problem 4 Writing and Evaluating an Expression

**Got It?** In basketball, teams can score by making two-point shots, three-point shots, and one-point free throws. What algebraic expression models the total number of points that a basketball team scores in a game? If a team makes 10 two-point shots, 5 three-point shots, and 7 free throws, how many points does it score in all?

21. Define the variables.

Let  $t$  = the number of two-point shots,

Let  $h$  = , and

Let  $f$  = .

22. Complete the expression for the total number of points a team can score in one game.

2  + 3  +

23. Evaluate the expression for  $t = 10$ ,  $h = 5$ , and  $f = 7$ .

24. The team scored  points.

The expression  $5ax + 6y - 7$  has three *terms*:  $5ax$ ,  $6y$ , and  $-7$ .

The *coefficient* is the numerical factor of a term: 5, 6

The *constant term* is the term with no variables:  $-7$ .

Identify the *coefficients* and the *constant term* in each expression.

25.  $2x^2 - 3x + 5$

Coefficients:  and

Constant:

26.  $-4yx + 8x - 3$

Coefficients:  and

Constant:



## Problem 5 Simplifying Algebraic Expressions

**Got It?** Combine like terms. What is a simpler form of the expression  $-4j^2 - 7k + 5j + j^2$ ?

At the right is one student's solution.

~~Rose's Solution~~

$$\begin{aligned} -4j^2 - 7k + 5j + j^2 &= -3j^2 - 7k + 5j \\ &= -3j^2 - 2kj \end{aligned}$$

27. What error did Rose make?

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28. Simplify the expression correctly.

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## Lesson Check • Do you UNDERSTAND?

**Compare and Contrast** How are algebraic expressions and numerical expressions alike? How are they different? Include examples to justify your reasoning.

29. How is an algebraic expression different from a numerical expression?

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30. Put an **N** next to each *numerical expression*. Put an **A** next to each *algebraic expression*.

$3x + 2$	<input type="checkbox"/>	$6 \cdot 4$	<input type="checkbox"/>	$a - 7$	<input type="checkbox"/>	$4 \cdot 1 + 10$	<input type="checkbox"/>	$\frac{5g}{3} + h$	<input type="checkbox"/>
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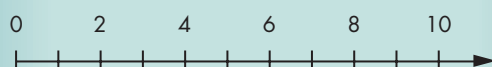
## Math Success

Check off the vocabulary words that you understand.

☐ term   ☐ evaluate   ☐ coefficient   ☐ constant   ☐ terms   ☐ like terms

Rate how well you can *write and evaluate algebraic expressions*.

Need to  
review



Now I  
get it!