1-3 Algebraic Expressions

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	Column B
Distributive Property for Subtraction	$-(a + b) = -a + (-b) = -a - b$
Multiplication by 0	$-(-a) = a$
Multiplication by -1	$-1 \cdot a = -a$
Opposite of a Sum	$a(b - c) = ab - ac$
Opposite of a Difference	$0 \cdot a = 0$
Opposite of an Opposite	$-(a - b) = -a + b = b - a$

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	·	the number of days
Write	☐	−	☐	·	☐

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.

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

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

$-4j^2 - 7k + 5j + j^2 = -3j^2 - 7k + 5j$

$= -3j^2 - 2kj$

27. What error did Rose make?

_____

_____

28. Simplify the expression correctly.

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?

_____

_____

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

$3x + 2$ ___ $6 \cdot 4$ ___ $a - 7$ ___ $4 \cdot 1 + 10$ ___ $\frac{5g}{3} + h$ ___

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 0 2 4 6 8 10 Now I get it!