1-7 The Distributive Property

Vocabulary

Review

1. Circle the *property* of addition illustrated by $7 + 0 = 7$.

Associative Property | Commutative Property | Identity Property | Zero Property

2. Circle the *property* of multiplication illustrated by $4 \cdot 0 = 0$.

Associative Property | Commutative Property | Identity Property | Zero Property

3. Circle the *property* of addition that is illustrated by $(63 + 9) + 1 = 63 + (9 + 1)$.

Associative Property | Commutative Property | Identity Property

4. Circle the *property* of multiplication that is illustrated by $52 \cdot (-1) = -52$.

Identity Property | Zero Property | Property of -1

Vocabulary Builder

distribute (verb) **dih STRIB yoot**

Other Word Forms: distributive (adjective), distribution (noun)

Definition: To **distribute** means to give out or hand out.

$7(3 + 6) = 7 \cdot 3 + 7 \cdot 6$

The factor 7 is **distributed** to the 3 and the 6.

Use Your Vocabulary

Complete each sentence with *distribute, distribution,* or *distributed*.

5. The teacher ? a marked test to each student in the class. _____

6. The ? of tests grades shows that there are 12 A's, 10 B's, and 8 C's. _____

7. After reviewing the test scores, the teacher will ? tonight's homework. _____

take note

Property Distributive Property

8. Complete the table.

Algebra Let a, b, and c be real numbers.	Example
$a(b + c) = ab + ac$	$3(10 + 4) = 3 \cdot \square + 3 \cdot \square$
$(b + c)a = ba + ca$	$(5 + 3)7 = 5 \cdot \square + 3 \cdot \square$
$a(b - c) = ab - ac$	$9(8 - 2) = 9 \cdot \square - 9 \cdot \square$
$(b - c)a = ba - ca$	$(28 - 6)4 = 28 \cdot \square - 6 \cdot \square$

Problem 1 Simplifying Expressions

Got It? What is the simplified form of $5(x + 7)$?

9. Circle how you read the expression $5(x + 7)$.

5 times x plus 7 5 times the quantity x plus 7

10. To simplify $5(x + 7)$, which number do you distribute? How do you know?

_____

_____

11. Finish simplifying the expression.

$$5(x + 7) = 5 \cdot \square + \square \cdot 7$$
$$= \square$$

Got It? What is the simplified form of $12(3 - \frac{1}{6}t)$?

12. Complete the steps to simplify the expression.

$$12(3 - \tfrac{1}{6}t) = \square \cdot 3 - \square \cdot \tfrac{1}{6}t$$
$$= \square - \frac{\square}{6} \cdot t$$
$$= \square - \square \cdot t$$

Problem 2 Rewriting Fraction Expressions

Got It? **What sum or difference is equivalent to $\frac{4x - 16}{3}$?**

13. Recall that a fraction $\frac{a}{b}$ can be written as $\frac{1}{b} \cdot a$.

So, $\frac{4x}{3}$ can be written as $\frac{\quad}{\quad} \cdot 4x$.

14. Now complete the steps to find an expression equivalent to $\frac{4x - 16}{3}$.

$\frac{4x - 16}{3} = \quad \cdot (4x - 16)$ Write the division as multiplication.

$= \quad \cdot (4x) - \quad \cdot (16)$ Use the Distributive Property.

$= \quad x - \quad$ Simplify.

The Multiplication Property of -1 states that $-1 \cdot x = -x$. To simplify an expression such as $-(x + 6)$, you can rewrite the expression as $-1(x + 6)$.

Problem 3 Using the Multiplication Property of -1

Got It? **What is the simplified form of $-(a + 5)$?**

15. Underline the correct word to complete the sentence.

A negative sign in front of the parentheses means that the entire expression inside the parentheses is the same / opposite.

16. Simplify $-(a + 5)$ by completing each step.

$-(a + 5) = - \quad \cdot (a + 5)$ Multiplication Property of -1

$= (\quad)(a) + (\quad)(5)$ Distributive Property

$=$ Simplify.

Problem 4 Using the Distributive Property for Mental Math

Got It? **Julia commutes to work on the train 4 times each week. A round-trip ticket costs $7.25. What is her weekly cost for tickets? Use mental math.**

17. The expression $4 \cdot 7.25$ is simplified below using steps that could be used to do the problem mentally. Complete the missing parts.

$4(7.25) = 4(7 + \quad)$ Write 7.25 as $7 + 0.25$.

$= \quad \cdot 7 + \quad \cdot 0.25$ Distributive Property

$= \quad +$ Multiply.

$=$ Add.

18. The weekly cost for her tickets is $\$$.

A *term* is a number, a variable, or the product of a number and one or more variables. *Like terms* have the same variable factors.

Circle the variable factors in each expression. Then circle *Yes* if they are *like terms* or *No* if they are not.

19. $3x^2 + 5x^2$

Yes / No

20. $z^2w - zw^2$

Yes / No

$5x^2 + 3xy - 2xy + 19$

terms

$3xy$ and $2xy$ are *like terms* because they both have the variable factor xy.

Problem 5 Combining Like Terms

Got It? **What is the simplified form of $3y - y$?**

21. Are the terms $3y$ and $-y$ *like terms*?

Yes / No

22. Use the Distributive Property to write $3y - y$ as a product. Then simplify.

$3y - y = y(\quad - \quad)$

$= y(\quad)$

Lesson Check • Do you UNDERSTAND?

Reasoning **Is each expression in simplified form? Justify your answer.**

$4xy^3 + 5x^3y$ $\qquad$ $-(y - 1)$ $\qquad$ $5x^2 + 12xy - 3yx$

23. Does $4xy^3 + 5x^3y$ have any like terms?

Yes / No

Is the expression simplified?

Yes / No

24. Can the -1 in front of $-(y - 1)$ be distributed?

Yes / No

Simplify the expression.

25. Can the last term of $5x^2 + 12xy - 3yx$ be written as $3xy$?

Yes / No

Simplify the expression.

Math Success

Check off the vocabulary words that you understand.

☐ Distributive Property ☐ term ☐ like terms

Rate how well you can *use the Distributive Property*.

Need to review 0 2 4 6 8 10 Now I get it!