

Objective: TSWBAT use the distributive property
to simplify expressions

Vocabulary

- ① Term - a number, a variable, or the product of a number and one or more variables
- ② constant - a term that has no variable
- ③ coefficient - a numerical factor of a term
- ④ like terms - have the same variable factors

Examples

$$\textcircled{1} \overbrace{3(x+8)} \\ 3x+24$$

$$\textcircled{2} \overbrace{(5b-4)(-7)} \\ -35b+28$$

$$\textcircled{3} \overbrace{12(3-\frac{1}{6}T)} \\ 36-2T$$

$$\textcircled{4} \overbrace{(0.4+1.1c)3} \\ 1.2+3.3c$$

$$\textcircled{5} \overbrace{(2y-1)(-y)} \\ -2y^2+y$$

$$\textcircled{6} \frac{7x+2}{5} \quad \frac{7x}{5} + \frac{2}{5}$$

$$\textcircled{7} \frac{15+6x}{12} \quad \frac{15}{12} + \frac{6x}{12} \\ \frac{5}{4} + \frac{1}{2}x$$

$$\textcircled{8} \frac{4-2x}{8} \quad \frac{4}{8} - \frac{2x}{8} \\ \frac{1}{2} - \frac{1}{4}x$$

$$\textcircled{9} -\overbrace{(2y-3x)} \\ -2y+3x$$

$$\textcircled{10} -\overbrace{(-x+31)} \\ x-31$$

$$\textcircled{11} -\overbrace{(4x-12)} \\ -4x+12$$

$$\textcircled{12} -\overbrace{(6m-9n)} \\ -6m+9n$$

Combine Like Terms

$$\textcircled{a} \quad \underbrace{5x - 3 - 3x + 6y + 4}_{2x + 6y + 1}$$

$$\textcircled{b} \quad \underbrace{7y^3z - 6y^3 + y^3z}_{8y^3z - 6y^3}$$

$$\textcircled{c} \quad \underbrace{7x - 5 - 3x + 2x + 1}_{6x - 4}$$

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 $52 \cdot (-1) = -52$.

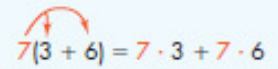
Identity Property Zero Property Property of -1

● Vocabulary Builder

distribute (verb) **dih STRIB yoot**

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

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


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.

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

$$= \square - \frac{\square}{6} \cdot t$$

$$= \square - \square \cdot t$$



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 $\frac{\square}{\square} \cdot 4x$.

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

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

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

$$= \square x - \square \quad \text{Simplify.}$$

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.

$$-(a + 5) = -\square \cdot (a + 5) \quad \text{Multiplication Property of } -1$$

$$= (\square)(a) + (\square)(5) \quad \text{Distributive Property}$$

$$= \square \quad \text{Simplify.}$$



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.

$$4(7.25) = 4(7 + \square) \quad \text{Write 7.25 as } 7 + 0.25.$$

$$= \square \cdot 7 + \square \cdot 0.25 \quad \text{Distributive Property}$$

$$= \square + \square \quad \text{Multiply.}$$

$$= \square \quad \text{Add.}$$

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

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.

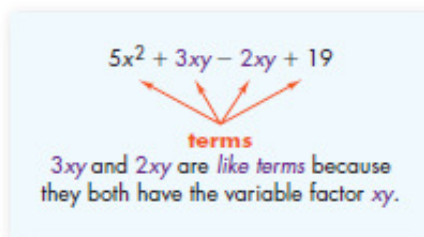
Circle the variable factors in each expression. Then circle *Yes* if they are *like terms* or *No* if they are not.

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

Yes / No

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

Yes / No



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.

$4xy^3 + 5x^3y$

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

Yes / No

Is the expression simplified?

Yes / No

$-(y - 1)$

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

Yes / No

Simplify the expression.

$5x^2 + 12xy - 3yx$

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*.

