

2.5

Apply the Distributive Property

Goal • Apply the distributive property.

Your Notes

VOCABULARY

Equivalent expressions Two expressions that have the same value for all values of the variable

Distributive property A property used to find the product of a number and a sum or difference

Terms The parts of an expression that are added together

Coefficient The number part of a term with a variable part

Constant term A term that has a number but no variable part

Like terms Terms that have the same variable parts

THE DISTRIBUTIVE PROPERTY

Let a , b , and c be real numbers.

Algebra

$$a(b + c) = ab + \underline{ac}$$

$$(b + c)a = ba + \underline{ca}$$

$$a(b - c) = ab - \underline{ac}$$

$$(b - c)a = ba - \underline{ca}$$

Numbers

$$4(2 + 3) = \underline{4(2)} + \underline{4(3)}$$

$$(3 + 5)2 = \underline{3(2)} + \underline{5(2)}$$

$$7(5 - 3) = \underline{7(5)} - \underline{7(3)}$$

$$(6 - 4)9 = \underline{6(9)} - \underline{4(9)}$$

Your Notes

Be sure to distribute the factor outside of the parentheses to *all* of the numbers inside the parentheses.

Use the distributive property to combine like terms with variable parts. Your expression is *simplified* if there are no grouping symbols and all like terms are combined.

Example 1 Apply the distributive property

Use the distributive property to write an equivalent equation.

Solution

a. $4(a + 3) = \underline{4a + 12}$

b. $(a + 5)6 = \underline{6a + 30}$

c. $3(x - 8) = \underline{3x - 24}$

d. $(4 - x)(x) = \underline{4x - x^2}$

Example 2 Distribute a negative number

Use the distributive property to write an equivalent equation.

Solution

a. $-3(7 + x)$
 $= \underline{-3(7)} + \underline{(-3)(x)}$ Distribute $\underline{-3}$.
 $= \underline{-21 - 3x}$ Simplify.

b. $(6 - a)(-2a)$
 $= 6(\underline{-2a}) - a(\underline{-2a})$ Distribute $\underline{-2a}$.
 $= \underline{-12a + 2a^2}$ Simplify.

✓ **Checkpoint** Use the distributive property to write an equivalent equation.

1. $5(n + 4)$

$\underline{5n + 20}$

2. $-a(3 + a)$

$\underline{-3a - a^2}$

Your Notes

Example 3 Identify parts of an expression

Identify the terms, like terms, coefficients, and constant terms of the expression $2x - 5 + 8x - 3$.

Solution

$$2x + (-5) + 8x + (-3)$$

Write the expression as a sum.

Terms:

$$2x, -5, 8x, -3$$

Like terms:

$$2x, 8x, -5, -3$$

Coefficients:

$$2, 8$$

Constant terms:

$$-5, -3$$

✓ **Checkpoint** Identify the terms, like terms, coefficients, and constant terms of the expressions.

3. $10 + 3a - 4 - 6a$

Terms: $10, 3a, -4, -6a$

Like terms: $10, -4; 3a, -6a$

Coefficients: $3, -6$

Constant terms: $10, -4$

4. $7y - 11 - 4y - 1$

Terms: $7y, -11, -4y, -1$

Like terms: $7y, -4y, -11, -1$

Coefficients: $7, -4$

Constant terms: $-11, -1$

Homework