

Study Guide

The Distributive Property

When you find the product of two integers, you find the sum of two partial products. For example, you can write

$$\begin{array}{r} 58 \\ \times 5 \\ \hline 290 \end{array} \quad \text{as} \quad \begin{array}{r} 50 + 8 \\ \times 5 \\ \hline 250 + 40 \end{array} \leftarrow (50 \times 5) + (8 \times 5)$$

The statement $(50 + 8) \times 5 = (50 \times 5) + (8 \times 5)$ illustrates the distributive property. The multiplier 5 is distributed over the 50 and the 8.

Distributive Property
For any numbers a , b , and c , $a(b + c) = ab + ac$ and $(b + c)a = ba + ca$; $a(b - c) = ab - ac$ and $(b - c)a = ba - bc$.

You can use the distributive property to simplify algebraic expressions.

Example: Simplify $4(a^2 + 3ab) - ab$.

$$\begin{aligned} 4(a^2 + 3ab) - ab &= 4(a^2 + 3ab) - 1ab && \text{Multiplicative identity} \\ &= 4a^2 + 12ab - 1ab && \text{Distributive property} \\ &= 4a^2 + (12 - 1)ab && \text{Distributive property} \\ &= 4a^2 + 11ab && \text{Substitution} \end{aligned}$$

Name the coefficient of each term. Then name the like terms in each list of terms.

1. $3x$, $3x^2$, $5x$

2. $2mn$, $10mn^2$, $12mn^2$, mn^2

Use the distributive property to find each product.

3. $4 \cdot 315$

4. $3 \cdot 24$

Use the distributive property to rewrite each expression.

5. $5(4x - 9)$

6. $9r^2 + 9s^2$

Simplify each expression, if possible. If not possible, write in simplest form.

7. $7b + 3b$

8. $4(5ac - 7)$

9. $21c + 18c + 31b - 3b$

10. $10x^2 - 6x^3$

11. $10xy - 4(xy + xy)$

12. $0.2(0.8 + 7y) + 0.36y$