

10-1 Study Guide and Intervention

Simplifying Algebraic Expressions

The Distributive Property can be used to simplify algebraic expressions.

Examples Use the Distributive Property to rewrite each expression.

1 $3(a + 5)$

$$\begin{aligned} 3(a + 5) &= 3(a) + 3(5) && \text{Distributive Property} \\ &= 3a + 15 && \text{Simplify.} \end{aligned}$$

2 $-2(d - 3)$

$$\begin{aligned} -2(d - 3) &= -2[d + (-3)] && \text{Rewrite } d - 3 \text{ as } d + (-3). \\ &= -2(d) + (-2)(-3) && \text{Distributive Property} \\ &= -2(d) + 6 && \text{Simplify.} \end{aligned}$$

When a plus sign separates an algebraic expression into parts, each part is called a **term**. In terms that contain a variable, the numerical part of the term is called the **coefficient** of the variable. A term without a variable is called a **constant**. **Like terms** contain the same variables, such as $3x$ and $2x$.

Example 3 Identify the terms, like terms, coefficients, and constants in the expression $7x - 5 + x - 3x$.

$$\begin{aligned} 7x - 5 + x - 3x &= 7x + (-5) + x + (-3x) && \text{Definition of subtraction} \\ &= 7x + (-5) + 1x + (-3x) && \text{Identity Property; } x = 1x \end{aligned}$$

The terms are $7x$, -5 , x , and $-3x$. The like terms are $7x$, x , and $-3x$. The coefficients are 7, 1, and -3 . The constant is -5 .

An algebraic expression is in **simplest form** if it has no like terms and no parentheses.

Example 4 Simplify the expression $-2m + 5 + 6m - 3$.

$-2m$ and $6m$ are like terms. 5 and -3 are also like terms.

$$\begin{aligned} -2m + 5 + 6m - 3 &= -2m + 5 + 6m + (-3) && \text{Definition of subtraction} \\ &= -2m + 6m + 5 + (-3) && \text{Commutative Property} \\ &= (-2 + 6)m + 5 + (-3) && \text{Distributive Property} \\ &= 4m + 2 && \text{Simplify.} \end{aligned}$$

Exercises

Use the Distributive Property to rewrite each expression.

1. $2(c + 6)$ 2. $-4(w + 6)$ 3. $(b - 4)(-3)$

4. Identify the terms, like terms, coefficients, and constants in the expression $4m - 2 + 3m + 5$.

Simplify each expression.

5. $3d + 6d$ 6. $2 + 5s - 4$ 7. $2z + 3 + 9z - 8$

10-1**Skills Practice*****Simplifying Algebraic Expressions***

Use the Distributive Property to rewrite each expression.

1. $4(j + 4)$

2. $5(n + 2)$

3. $(c + 9)3$

4. $2(w - 8)$

5. $(s - 7)7$

6. $-4(e + 6)$

7. $(b + 3)(-7)$

8. $-8(v - 7)$

9. $(2n + 3)6$

10. $5(c + d)$

11. $-7(3x - 1)$

12. $(e - f)3$

13. $2(-3m + 1)$

14. $(2b - 3)(-9)$

15. $-5(s + 7)$

16. $(t + 7)3$

17. $6(-2v + 4)$

18. $(m - n)(-3)$

Identify the terms, like terms, coefficients, and constants in each expression.

19. $4e + 7e + 5$

20. $5 - 4x - 8$

21. $-3h - 2h + 6h + 9$

22. $7 - 5y + 2 + 1$

23. $9k + 7 - k + 4$

24. $4z + 3 - 2z - z$

Simplify each expression.

25. $3t + 6t$

26. $4r + r$

27. $7f - 2f$

28. $9a - 8a$

29. $5c + 8c$

30. $2g - 5g$

31. $8k + 3 + 4k$

32. $7m - 5m - 6$

33. $9 - 6x + 5$

34. $7p - 1 - 9p + 5$

35. $-b - 3b + 8b + 4$

36. $5h - 6 - 8 + 7h$

37. $8b + 6 - 8b + 1$

38. $t - 5 - 2t + 5$

39. $4w - 5w + w$

40. $6m - 7 + 2m + 7$

41. $5f - 7f + f$

42. $12y - 8 + 4y + y$

43. $9a + 5 - 7a - 2a$

44. $6g - 7g + 13$

45. $7x + 6 - 9x - 3$