

Multiplying Binomials (Pages 399–404)

You can use the Distributive Property to multiply binomials. You can also use a shortcut called the **FOIL method**.

FOIL Method for Multiplying Two Binomials	To multiply two binomials, find the sum of the products of F the <i>First</i> terms, O the <i>Outer</i> terms, I the <i>Inner</i> terms, and L the <i>Last</i> terms.
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EXAMPLES

A Find $(2x + 3)(4x - 1)$.

Use the FOIL method.

$$\begin{aligned} (2x + 3)(4x - 1) &= (2x)(4x) + (2x)(-1) + (3)(4x) + (3)(-1) \\ &= 8x^2 + (-2x) + 12x + (-3) \\ &= 8x^2 + 10x - 3 \quad \text{Combine like terms.} \end{aligned}$$

B Find $(3y + 2)(y - 4)$.

Use the Distributive Property twice.

$$\begin{aligned} (3y + 2)(y - 4) &= 3y(y - 4) + 2(y - 4) \\ &= 3y(y - 4) + 2(y - 4) \\ &= 3y(y) + 3y(-4) + 2(y) + 2(-4) \\ &= 3y^2 - 12y + 2y - 8 \\ &= 3y^2 - 10y - 8 \quad \text{Combine like terms.} \end{aligned}$$

Try These Together

Find each product.

1. $(a + 7)(a + 1)$

2. $(d - 2)(d - 5)$

3. $(n + 9)(n - 9)$

HINT: Use the FOIL method to multiply binomials.

PRACTICE

Find each product. Use the Distributive Property or the FOIL method.

4. $(g + 5)(g - 2)$

5. $(2s - 8)(s + 2)$

6. $(9u - 5)(4u + 9)$

7. $(5b + 9)(9b + 3)$

8. $(13t - 4)(14t + 5)$

9. $(4r + 4s)(2r + 6s)$

10. $(9x + y)(x - y)$

11. $(4p + 4q)(p + q)$

12. $(3c + 2d)(c + 3d)$

13. $(2a + 4b)(2a - 3b)$

14. $(h^2 - 6)(h + 1)$

15. $(v^2 + 2)(v - 8)$

16. $(k^2 - k)(k + 7)$

17. $(4w^2 + 2)(w + 1)$

18. $(5g^2 - g)(g - 2)$

19. Construction The length of a room is 1 foot more than 4 times the height. The width is 2 feet less than 3 times the height. If h is the height of the room, write a polynomial that represents the volume of the room.



20. Standardized Test Practice What is the product $(x + 1)(2x - 3)$?

A $2x^2 + x - 3$

B $2x^2 - x - 3$

C $2x^2 + 5x - 3$

D $2x^2 - 4$

Answers: 1. $a^2 + 8a + 7$ 2. $d^2 - 7d + 10$ 3. $n^2 - 81$ 4. $g^2 + 3g - 10$ 5. $2s^2 - 4s - 16$ 6. $36k^2 + 61k - 45$
 7. $45b^2 + 96b + 27$ 8. $182t^2 + 9t - 20$ 9. $8r^2 + 32rs + 24s^2$ 10. $9x^2 - 8xy - y^2$ 11. $4p^2 + 8pq + 4q^2$
 12. $3c^2 + 11cd + 6d^2$ 13. $4a^2 + 2ab - 12b^2$ 14. $h^3 + h^2 - 6h - 6$ 15. $v^3 - 8v^2 + 2v - 16$ 16. $k^3 + 6k^2 - 7k$
 17. $4w^3 + 4w^2 + 2w + 2$ 18. $5g^3 - 11g^2 + 2g$ 19. $12h^3 - 5h^2 - 2h$ 20. B