

8-7 Multiplying Polynomials (Pages 452–457)

Use the distributive property to multiply polynomials. If you are multiplying two binomials, you can 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 L the <i>Last</i> terms.
--	--

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 $(3y + 2)(5y^2 - 2y - 4)$.

Use the Distributive Property twice.

$$\begin{aligned}
 (3y + 2)(5y^2 - 2y - 4) &= 3y(5y^2 - 2y - 4) + 2(5y^2 - 2y - 4) \\
 &= 15y^3 - 6y^2 - 12y + 10y^2 - 4y - 8 \\
 &= 15y^3 + 4y^2 - 16y - 8 \quad \text{Combine like terms.}
 \end{aligned}$$

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.

- | | | |
|-------------------------------|---|---|
| 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. $(2x + 7)(3x^2 + 8x - 4)$ | 11. $(h^2 - 6h + 2)(h + 1)$ | 12. $(9v^2 - v + 8)(v - 7)$ |
| 13. $(4q + 0.7)(4q - 0.4)$ | 14. $(0.6p + 9q)(0.2p + q)$ | 15. $(2w + 0.2)(9w - 0.7)$ |
| 16. $(0.1c - 8)(0.3c + 3)$ | 17. $\left(6k + \frac{1}{4}\right)\left(k - \frac{1}{2}\right)$ | 18. $\left(f - \frac{1}{3}g\right)\left(\frac{2}{3}f + 3g\right)$ |

19. Decorating The length of a windowless 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 wall area, including any doors.

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

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. $9w^2 - 7d + 10$ 3. $n^2 - 81$ 4. $g^2 + 3g - 10$ 5. $2s^2 - 4s - 16$ 6. $36u^2 + 61u - 45$
 7. $45b^2 + 96b + 27$ 8. $182t^2 + 9t - 20$ 9. $8r^2 + 32rs + 24s^2$ 10. $6x^3 + 37x^2 + 48x - 28$ 11. $h^3 - 5h^2 - 4h + 2$
 12. $9v^3 - 64v^2 + 15v - 56$ 13. $16q^2 + 1.2q - 0.28$ 14. $0.12p^2 + 2.4pq + 9q^2$ 15. $18w^2 + 0.4w - 0.14$
 16. $0.03c^2 - 2.1c - 24$ 17. $6k^2 - 2\frac{2}{3}k - \frac{8}{1}$ 18. $\frac{2}{3}f^2 + 2\frac{2}{3}fg - g^2$ 19. $14h^2 - 2h$ 20. B