

Special Products (Pages 405–409)

In addition to the FOIL method, other shortcuts exist for finding special products of binomials.

Square of a Sum	$(a + b)^2 = (a + b)(a + b) = a^2 + 2ab + b^2$
Square of a Difference	$(a - b)^2 = (a - b)(a - b) = a^2 - 2ab + b^2$
Product of a Sum and a Difference	$(a + b)(a - b) = a^2 - b^2$

EXAMPLES

A Find $(s + 5)^2$.

Use the square of a sum rule.

$$\begin{aligned}(a + b)^2 &= a^2 + 2ab + b^2 \\ (s + 5)^2 &= (s)^2 + 2(s)(5) + (5)^2 \\ &= s^2 + 10s + 25\end{aligned}$$

B Find $(3g - 8)^2$.

Use the square of a difference rule.

$$\begin{aligned}(a - b)^2 &= a^2 - 2ab + b^2 \\ (3g - 8)^2 &= (3g)^2 - 2(3g)(8) + (8)^2 \\ &= 9g^2 - 48g + 64\end{aligned}$$

C Find $(4x + 7)(4x - 7)$.

Use the product of a sum and a difference rule.

$$\begin{aligned}(a + b)(a - b) &= a^2 - b^2 \\ (4x + 7)(4x - 7) &= (4x)^2 - (7)^2 \\ &= 16x^2 - 49\end{aligned}$$

D Find $(6y + 9z)(6y - 9z)$.

Use the product of a sum and a difference rule.

$$\begin{aligned}(a + b)(a - b) &= a^2 - b^2 \\ (6y + 9z)(6y - 9z) &= (6y)^2 - (9z)^2 \\ &= 36y^2 - 81z^2\end{aligned}$$

PRACTICE

Find each product.

- $(a + 9b)^2$
- $(c - 5d)^2$
- $(8m - n)^2$
- $(7z + 7)(7z - 7)$
- $(2g - h)(2g + h)$
- $(8s + 8t)^2$
- $(3u - 8v)^2$
- $(6q + 4r)^2$
- $(x + 2y)^2$
- $(3j - k)^2$
- $(8a - 2d)(8a + 2d)$
- $(4n + g)(4n - g)$
- $(2m + 2n)^2$
- $(5 - b)(5 + b)$
- $(2t - r)(2t + r)$
- $(4c - 3k)^2$
- $(2f + 4g)^2$
- $(6x - 8y)^2$



19. Standardized Test Practice What is the product $(x + 4)(x - 4)$?

A $x^2 - 8x - 16$

B $x^2 + 16$

C $x^2 - 16$

D $x^2 + 8x - 16$

Answers: 1. $a^2 + 18ab + 81b^2$ 2. $c^2 - 10cd + 25d^2$ 3. $64m^2 - 16mn + n^2$ 4. $49z^2 - 49$ 5. $4g^2 - h^2$ 6. $64s^2 + 128st + 64t^2$ 7. $9u^2 - 48uv + 64v^2$ 8. $36q^2 + 48qr + 16r^2$ 9. $x^2 + 4xy + 4y^2$ 10. $9j^2 - 6jk + k^2$ 11. $64a^2 - 4d^2$ 12. $16m^2 - g^2$ 13. $2m^2 + 8mn + 4n^2$ 14. $25 - b^2$ 15. $4t^2 - r^2$ 16. $16c^2 - 24ck + 9k^2$ 17. $4f^2 + 16fg + 16g^2$ 18. $36x^2 - 96xy + 64y^2$ 19. C