

8-8 Study Guide and Intervention

Special Products

Squares of Sums and Differences Some pairs of binomials have products that follow specific patterns. One such pattern is called the *square of a sum*. Another is called the *square of a difference*.

| | |
|------------------------|--|
| Square of a sum | $(a + b)^2 = (a + b)(a + b) = a^2 + 2ab + b^2$ |
| Square of a difference | $(a - b)^2 = (a - b)(a - b) = a^2 - 2ab + b^2$ |

Example 1 Find $(3a + 4)(3a + 4)$.

Use the square of a sum pattern, with $a = 3a$ and $b = 4$.

$$\begin{aligned}(3a + 4)(3a + 4) &= (3a)^2 + 2(3a)(4) + (4)^2 \\ &= 9a^2 + 24a + 16\end{aligned}$$

The product is $9a^2 + 24a + 16$.

Example 2 Find $(2z - 9)(2z - 9)$.

Use the square of a difference pattern with $a = 2z$ and $b = 9$.

$$\begin{aligned}(2z - 9)(2z - 9) &= (2z)^2 - 2(2z)(9) + (9)(9) \\ &= 4z^2 - 36z + 81\end{aligned}$$

The product is $4z^2 - 36z + 81$.

Exercises

Find each product.

1. $(x - 6)^2$

2. $(3p + 4)^2$

3. $(4x - 5)^2$

4. $(2x - 1)^2$

5. $(2h + 3)^2$

6. $(m + 5)^2$

7. $(c + 3)^2$

8. $(3 - p)^2$

9. $(x - 5y)^2$

10. $(8y + 4)^2$

11. $(8 + x)^2$

12. $(3a - 2b)^2$

13. $(2x - 8)^2$

14. $(x^2 + 1)^2$

15. $(m^2 - 2)^2$

16. $(x^3 - 1)^2$

17. $(2h^2 - k^2)^2$

18. $\left(\frac{1}{4}x + 3\right)^2$

19. $(x - 4y^2)^2$

20. $(2p + 4q)^2$

21. $\left(\frac{2}{3}x - 2\right)^2$