

8.3

FINDING SPECIAL PRODUCTS OF POLYNOMIALS

Square of a Sum

$$(a + b)^2$$



$$a^2 + 2ab + b^2$$

Examples

a. Find $(\textcircled{s} + \textcircled{5})^2$.

Use the square of a sum rule.

$$(a + b)^2 = a^2 + 2ab + b^2$$

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

1. $(\textcircled{d} + \textcircled{1})^2$

$$a^2 + 2ab + b^2$$

$$(d)^2 + 2(d)(1) + (1)^2$$

$$\boxed{d^2 + 2d + 1}$$

2. $(\textcircled{2x} + \textcircled{3y})^2$

$$a^2 + 2ab + b^2$$

$$(2x)^2 + 2(2x)(3y) + (3y)^2$$

$$\boxed{4x^2 + 12xy + 9y^2}$$

Square of a Difference

$$(a - b)^2$$



$$a^2 - 2ab + b^2$$

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

Use the square of a difference rule.

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

$$3. (\underbrace{a}_{\text{"a"}} - \underbrace{4}_{\text{"b"}})^2$$

$$a^2 - 2ab + b^2$$

$$(a)^2 - 2(a)(4) + (4)^2$$

$$a^2 - 8a + 16$$

$$4. (\underbrace{5g}_{\text{"a"}} - \underbrace{2h}_{\text{"b"}})^2$$

$$a^2 - 2ab + b^2$$

$$(5g)^2 - 2(5g)(2h) + (2h)^2$$

$$25g^2 - 20gh + 4h^2$$

Difference of Squares

$$(a + b)(a - b)$$



$$a^2 - b^2$$

c. Find $(\textcircled{4x} + \textcircled{7})(\textcircled{4x} - \textcircled{7})$.

Use the difference of squares rule.

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

"a" "b"

5. $(\textcircled{b} - \textcircled{2c})(\textcircled{b} + \textcircled{2c})$

$$\begin{aligned} a^2 - b^2 \\ (b)^2 - (2c)^2 &= \boxed{b^2 - 4c^2} \end{aligned}$$

6. $(\textcircled{6k} + \textcircled{11})(\textcircled{6k} - \textcircled{11})$

$$\begin{aligned} a^2 - b^2 \\ (6k)^2 - (11)^2 &= \boxed{36k^2 - 121} \end{aligned}$$

PUT IT ALL TOGETHER...

1. $(7y + 3)^2$

$$(7y)^2 + 2(7y)(3) + (3)^2$$

$$\boxed{49y^2 + 42y + 9}$$

2. $(3m - 8n)^2$

$$(3m)^2 - 2(3m)(8n) + (8n)^2$$

$$\boxed{9m^2 - 48mn + 64n^2}$$

3. $(2b + 5)(2b - 5)$

$$(2b)^2 - (5)^2$$

$$\boxed{4b^2 - 25}$$

4. $(6w - 4z)(6w + 4z)$

$$(6w)^2 - (4z)^2 = \boxed{36w^2 - 16z^2}$$

CHALLENGE...

1. $(3m + 2)(3m - 2)(m + 7)$

$$(3m)^2 - (2)^2$$

$$(9m^2 - 4)(m + 7)$$

$$9m^2(m + 7) - 4(m + 7)$$

$$\boxed{9m^3 + 63m^2 - 4m - 28}$$

2. $(k + 2)(k - 5)(k - 2)(k + 5)$

$$(k + 2)(k - 2)(k - 5)(k + 5)$$

$$(k^2 - 4)(k^2 - 25)$$

$$k^4 - 25k^2 - 4k^2 + 100$$

$$\boxed{k^4 - 29k^2 + 100}$$