

Algebra 1

Lesson 9.3

Special Products of Polynomials

Warm-Up

Find the product.

(a) $(5m+1)(3m-1)$

$$15m^2 - 5m + 3m - 1$$

$$15m^2 - 2m - 1$$

(b) $(a+3)(a^2+2a+3)$

$$a^3 + 2a^2 + 3a + 3a^2 + 6a + 9$$

$$a^3 + 5a^2 + 9a + 9$$

(c) $(x-1)(x^2-3x+4)$

$$x^3 - 3x^2 + 4x - x^2 + 3x - 4$$

$$x^3 - 4x^2 + 7x - 4$$

Example 1. Sum and Difference Pattern

Find the product.

(a) $(x+2)(x-2)$

$$x^2 + 2x - 2x - 4$$

$$x^2 - 4$$

(b) $(x+4)(x-4)$

$$x^2 - 16$$

(c) $(c-8)(c+8)$

$$c^2 - 64$$

Special Product Patterns

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

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

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

Example 2. Square of a Binomial

Find the product.

(a) $(x+2)^2$

$$x^2 + 2 \cdot x \cdot 2 + 2^2$$

$$x^2 + 4x + 4$$

(b) $(x+5)^2$

$$x^2 + 10x + 25$$

(c) $(c-8)^2$

$$c^2 - 16c + 64$$

(d) $(t-1)^2$

$$t^2 - 2t + 1$$

Try It!

Find the product. Be careful to check the signs (+, -)

(a) $(a+9)(a-9)$

$$a^2 - 81$$

(b) $(y+5)(y-5)$

$$y^2 - 25$$

(c) $(d+4)^2$

$$d^2 + 8d + 16$$

(d) $(x-6)^2$

$$x^2 - 12x + 36$$

Example 3. More Square of a Binomial and Sum AND Difference.

Find the product.

(a) $(2x+y)(2x-y)$

$$4x^2 - y^2$$

(b) $(3z+2)(3z-2)$

$$9z^2 - 4$$

(c) $(2n-5)^2$

$$4n^2 - 20n + 25$$

(d) $(4x+3y)^2$

$$16x^2 + 24xy + 9y^2$$

Assignment

New: Pg. 572 #4 - 34 (evens, SKIP 20, 22)

Review:

Simplify.

1. $(x^3)(x^5)$

2. $\frac{x^2}{x^8}$

3. $5x^0$

4. $(x^3y^5)^3$

5. $\frac{x^{-3}}{x^4}$

6. $(-3a^4b^{-1})(2a^2b^{-2})$

7. $(-c^3)(-c)^4(-c)$