



5.4 Multiplying Polynomials

Written by: Cindy Alder

Objectives:

- Multiply terms.
- Multiply any two polynomials.
- Multiply binomials.
- Find the product of the sum and difference of two terms.
- Find the square of a binomial.
- Multiply polynomial functions.

[Example 1]

- Find each product.

- $8k^3y(9ky^3)$

- $-2x(9x - 5)$

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

[Example 2]

- Find the product.

$$y^2(y + 7) + 2y(y - 5) - 4(2y + 1)$$

[Example 3]

- Find each product.

- $(x - 2)(x - 6)$

- $(5x - 6)(2y + 3)$

[Example 4]

- Find the product.

$$(3 - 2x)(5 + 2x + x^2)$$

[Example 5]

- Find the product.

$$(y^3 - 2y^2 + 1)(2y^2 + 4y + 3)$$

[Example 6]

- Find the product.

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

[Example 7]

- Find each product.

- $(m + 5)(m - 5)$

- $(x - 4y)(x + 4y)$

Product of the Sum and Difference of Two Terms

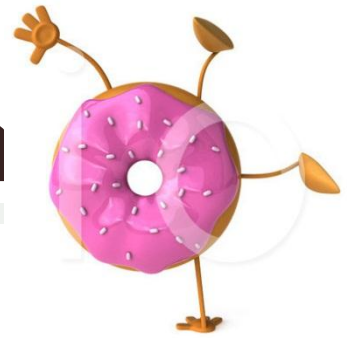
The **product of the sum and difference of the two terms x and y** is the difference of the squares of the terms.

■ Find each product.

- $(6x + 5y)(6x - 5y)$

- $4y^2(y + 7)(y - 7)$

[The Doughnut Question]



- Multiply: $(x + 3)^2$

Square of a Binomial

The **square of a binomial** is the sum of the first of the first term, twice the product of the two terms, and the square of the last term.

[Example 8]

- Find each product.

- $(x - 9)^2$

- $(3p - 4)^2$

- $(2y + 5)^2$

- $(5k - 7n)^2$



[Example 9]

- Find the product.

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

[Example 10]

- Find the product.

$$(y - 3)^4$$

[Example 11]

- For $f(x) = 3x + 4$ and $g(x) = 2x^2 + 2$, find $(fg)(x)$ and $(fg)(-1)$.