

# Multiplying Specials Cases Notes

## Special Products:

### Type 1: Square of Binomial

$$(x + y)^2 = x^2 + 2xy + y^2$$

$$(x - y)^2 = x^2 - 2xy + y^2$$

### Type 2: Sum and Difference of the Same Two Terms

$$(x + y)(x - y) = x^2 - y^2$$

**Sample problem 1:** find the product of the square of the following binomials.

1.  $(a^3 - 5)^2$

$$(x - y)^2 = x^2 - 2xy + y^2$$

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

$$a^6 - 10a^3 + 25$$

2.  $(3x + 7)^2$

$$(x + y)^2 = x^2 + 2xy + y^2$$

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

$$9x^2 + 42x + 49$$

3.  $(5x^3 - 9y^4)^2$

$$(x - y)^2 = x^2 - 2xy + y^2$$

$$(5x^3)^2 - 2(5x^3)(9y^4) + (9y^4)^2$$

$$25x^6 - 90x^3y^4 + 81y^8$$

4.  $(x^4 + 3a^5)^2$

$$(x + y)^2 = x^2 + 2xy + y^2$$

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

$$x^8 + 6x^4a^5 + 9a^{10}$$

**Sample Problem 2:** find the product of the sum and difference of same two term.

5.  $(4x + 5y)(4x - 5y)$

$$(x + y)(x - y) = x^2 - y^2$$

$$(4x)^2 - (5y)^2$$

$$16x^2 - 25y^2$$

6.  $(3x - 7)(3x + 7)$

$$(x + y)(x - y) = x^2 - y^2$$

$$(3x)^2 - (7)^2$$

$$9x^2 - 49$$

7.  $(6x^{11} - 11y^4)(6x^{11} + 11y^4)$

$$(x + y)(x - y) = x^2 - y^2$$

$$(6x^{11})^2 - (11y^4)^2$$

$$36x^{22} - 121y^8$$

8.  $(x^{11} - y^{21})(x^{11} + y^{21})$

$$(x + y)(x - y) = x^2 - y^2$$

$$(x^{11})^2 - (y^{21})^2$$

$$x^{22} - y^{42}$$