

Difference of 2 Squares

When two perfect square terms subtracted together.

Perfect Square term: • The number must be a perfect square

• The powers of each variable must be even.

Formula:

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

a =

b =

$$(25x^2 - 9) \quad a = 5x \\ b = 3$$

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

$$\text{ex) } a = 14x^4y^3 \quad (196x^8y^6 - 121a^4b^2)$$

$$b = 11a^2b \quad (14x^4y^3 + 11a^2b)(14x^4y^3 - 11a^2b)$$

Difference of 2 Cubes

Perfect Cube: • Number is a perfect cube
Terms • Powers are multiples of 3.

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

$$a = 3x$$
$$b = 2$$

$$(27x^3 - 8) = (3x - 2)((3x)^2 + (3x)(2) + (2)^2)$$
$$(3x - 2)(9x^2 + 6x + 4)$$

Sum of 2 Cubes:
(add)

$$(a^3 + b^3) = (a + b)(a^2 - ab + b^2)$$

$$(64a^3 + 125) \quad \begin{matrix} a = 4a \\ b = 5 \end{matrix}$$

$$(4a + 5)((4a)^2 - (4a)(5) + (5)^2)$$

$$(4a + 5)(16a^2 - 20a + 25)$$

$$(-216x^6y^9 - 8z^3) \quad (a-b)(a^2+ab+b^2)$$

$$a = -6x^2y^3$$

$$b = 2z$$

$$(-6x^2y^3 - 2z) \left((-6x^2y^3)^2 + (-6x^2y^3)(2z) + (2z)^2 \right)$$

$$(-6x^2y^3 - 2z) (36x^4y^6 - 12x^2y^3z + 4z^2)$$

Factoring by Grouping:

- ① Used for polynomials w/ 4 or more terms.
- ② Group the 1st half & 2nd half of the terms w/ parentheses
- ③ Factor out the GCF from each group.
- ④ Make the two factors.

$$(40xy + 30x)(-100y - 75)$$

$$10x(4y + 3) - 25(4y + 3)$$

$$(4y + 3)(10x - 25)$$