

THE DIFFERENCE/SUM OF CUBES

Formulas : $x^3 - y^3 = (x - y)(x^2 + xy + y^2)$

$$x^3 + y^3 = (x + y)(x^2 - xy + y^2)$$

Example 1 : $x^3 - 27$

$$= x^3 - 3^3$$

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

break down to cubes

factor using formula

Example 2 : $27x^3 + 8y^3$

$$= 3^3 x^3 + 2^3 y^3$$

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

$$= (3x + 2y)(9x^2 - 6xy + 4y^2)$$

break down to cubes

factor using formula

Example 3 : $x^6 - 64$

$$= x^6 - 2^6$$

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

$$= [(x^2) - (2^2)][(x^2)^2 + (x^2)(2^2) + (2^2)^2]$$

$$= (x^2 - 2^2)(x^4 + 4x^2 + 16)$$

$$= (x + 2)(x - 2)(x^4 + 4x^2 + 16)$$

break down to exponents

break down into cubes

use formula

why?

Example 4 : $8x^3 + 27y^3$

$$= 2^3 x^3 + 3^3 y^3$$

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

$$= (2x + 3y)(4x^2 - 6xy + 9y^2)$$

break down to cubes

use formula

Example 5 : $x^6 + 64$

$$= x^6 + 2^6$$

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

$$= [(x^2) + (2^2)][(x^2)^2 - (x^2)(2^2) + (2^2)^2]$$

$$= (x^2 + 4)(x^4 - 4x^2 + 16)$$

break down to exponents

break down to cubes

use formula