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Sum/Difference of Cubes

Sum of Two Cubes

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

Example

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

Difference of Two Cubes

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

Example

$$64x^3 - 1 = (4x)^3 - 1^3$$
$$= (4x - 1)(16x^2 + 4x + 1)$$

What are the perfect squares? 1, 4, 9, 16, 25, 36, 49 ...

What are the perfect cubes? 1, 8, 27, 64, 125, 216 ...