

SUM OF CUBES

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

Diagram illustrating the Sum of Cubes formula:

- An arrow labeled "Same sign" points from a in $(a + b)$ to a in a^2 .
- An arrow labeled "opposite sign" points from b in $(a + b)$ to $-ab$.
- An arrow labeled "addition" points from b in $(a + b)$ to b^2 .

DIFFERENCE OF CUBES

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

Diagram illustrating the Difference of Cubes formula:

- An arrow labeled "Same sign" points from a in $(a - b)$ to a in a^2 .
- An arrow labeled "opposite sign" points from $-b$ in $(a - b)$ to $+ab$.
- An arrow labeled "addition" points from $-b$ in $(a - b)$ to b^2 .

① $x^3 + 125$

$a = x$ $b = 5$

$$(x + 5)(x^2 - 5x + 25)$$

② $x^3 + 64$

$a = x$ $b = 4$

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

③ $27x^3 + 216$

$a = 3x$ $b = 6$

$$(3x + 6)(9x^2 - 18x + 36)$$

④ $x^3 - 27$

$a = x$ $b = 3$

$$(x - 3)(x^2 + 3x + 9)$$

⑤ $x^3 - 1000$

$a = x$ $b = 10$

$$(x - 10)(x^2 + 10x + 100)$$

⑥ $125x^3 - 8$

$a = 5x$ $b = 2$

$$(5x - 2)(25x^2 + 10x + 4)$$