

Куб суммы и разности

$$1)(!!!) x^3 + 3x^2y + 3y^2x + y^3 = x^2(x+3y) + y^2(3x+y)$$

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

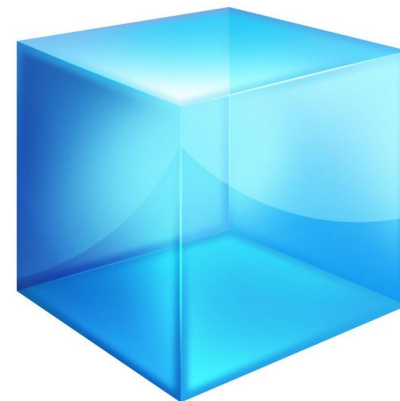
$$x^3 + 3x^2y + 3y^2x + y^3 = \\ = x^3 + x^2y + x^2y + x^2y + y^2x + y^2x + y^2x + y^3 = \\ = x^2(x+y) + xy(x+y) + xy(x+y) + y^2(x+y) = \\ = (x+y)(x^2 + xy + xy + y^2) = \\ = (x+y)(x^2 + 2xy + y^2) = \\ = (x+y)(x+y)^2 = (x+y)^3$$

ДЗ

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

$$(x+y)^3 = (x+y)^2 \cdot (x+y) = (x^2 + 2xy + y^2) \cdot (x+y) = (x^2 + 2xy + y^2) \cdot x + (x^2 + 2xy + y^2) \cdot y = \\ = x^3 + 2x^2y + xy^2 + yx^2 + 2xy^2 + y^3 = x^3 + 3x^2y + 3xy^2 + y^3$$

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



$$2xy = xy + xy$$

$$-xy - xy = xy(-1-1) = -2xy$$

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

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

$$xy^2 + 2xy^2 = xy^2(1+2) = 3xy^2$$