

Куб суммы и разности

$$3a=a+a+a$$

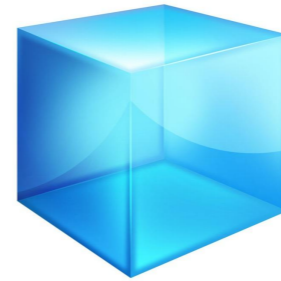
$$1)(!!!) x^3 + 3x^2y + 3y^2x + y^3 = \dots$$

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

ДОКАЗАТЕЛЬСТВО  $(a+b)^3=a^3 + 3a^2b + 3b^2a + b^3$  *налево<=справа*

голая группировка через расщипление

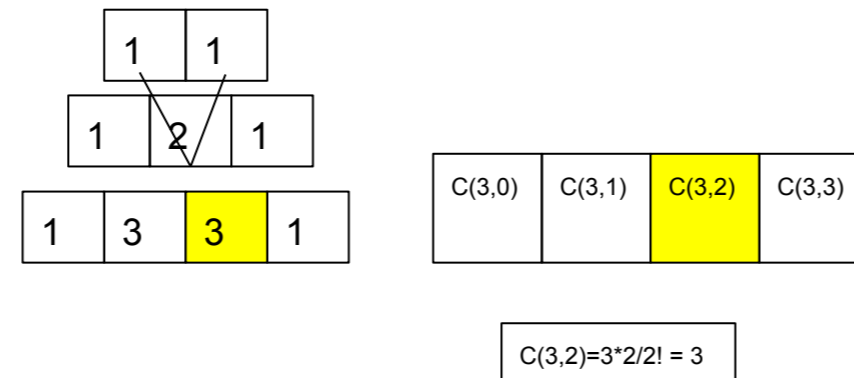
$$\begin{aligned}
 x^3 + 3x^2y + 3y^2x + y^3 &= x^3 + x^2y + x^2y + x^2y + y^2x + y^2x + y^2x + y^3 = \\
 &= x(x^2 + xy + xy + y^2) + y(x^2 + yx + yx + y^2) = (x+y)(x^2 + xy + xy + y^2) = \\
 &= (x+y)(x(x+y) + y(x+y)) = (x+y)((x+y)(x+y)) = (x+y)^3
 \end{aligned}$$



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

$$(a+b)^3 = 1 \cdot a^3 + 3 \cdot a^2b + 3 \cdot b^2a + 1 \cdot b^3$$

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



группировка через формулу

$$\begin{aligned}
 x^3 + 3x^2y + 3y^2x + y^3 &= (x+y)(x^2 - xy + y^2) + 3xy(x+y) = (x+y)((x^2 - xy + y^2) + 3xy) = (x+y)(x^2 - xy + y^2 + 3xy) = \\
 &= (x+y)(x^2 + y^2 + 2xy) = (x+y)(x^2 + y^2 + xy + xy) = (x+y)^3
 \end{aligned}$$

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

$$b = 3xy$$

$$(x+y)a + (x+y)b = (a+b)(x+y)$$

ДОКАЗАТЕЛЬСТВО  $(a+b)^3=a^3 + 3a^2b + 3b^2a + b^3$  *слева=>направо*

ЧИТЕРСТВО

$$\begin{aligned}
 (x+y)^3 &= ((x+y)(x+y))(x+y) = (x^2 + y^2 + 2xy)(x+y) = x(x^2 + y^2 + 2xy) + y(x^2 + y^2 + 2xy) = \\
 &= x^3 + x^2y + x^2y + 2xy^2 + y^2x + y^2x + 2xy^2 = x^3 + xy^2 + 2yx^2 + yx^2 + y^3 + 2xy^2 = \\
 &= x^3 + 3xy^2 + 3yx^2 + y^3
 \end{aligned}$$

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

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

ИИ

Между Азербайджаном и Арменией

$$\begin{aligned}
 (x+y)(x^2 - xy + y^2) &= x(x^2 - xy + y^2) + y(x^2 - xy + y^2) = \\
 &= x^3 - x^2y + x^2y - xy^2 + y^2x - y^2x + y^3 = x^3 + y^3
 \end{aligned}$$

$$\begin{aligned}
 (x+y)(x^2 - xy + y^2) \\
 (x+y)(x^2 + xy + y^2)
 \end{aligned}$$

$$x^4 + y^4 = ( ) ( )$$

ОСНОВНЫЕ ЗАПОВЕДИ

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

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

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

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

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

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

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

ДОМАШНЕЕ ЗАДАНИЕ

методом группировки

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

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

доказать через читерство (через раскрытие скобок)

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

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

$$x^3 - 2xy^2 + xy^2 - yx^2 + 2xy^2 - y^3 =$$

$$= x^3 - 2yx^2 + xy^2 - yx^2 + 2xy^2 - y^3 =$$

$$= x^3 - y^3 - 3yx^2 + 3xy^2$$

