

Некоторые более сложные примеры

Разложить на множители

- 1)(*) $x^4 + 4 = \dots$
- 2)(*) $2bc + a^2 - b^2 - c^2 = \dots$
- 3)(*) $x^4 - 21x^2 + 4 = \dots$
- 4)(**) $x^3 + y^3 + z^3 - 3xyz = \dots$
- 5)(*) $(x + y + z)^3 - x^3 - y^3 - z^3 = \dots$
- 6)(*) $x^4 + x^2y^2 + y^4 = \dots$
- 7)(*) $a^4 - 2a^3 + a^2 - 1 = \dots$
- 8)(*) $c^8 - c^4 - 2c^2 - 1 = \dots$
- 9)(*) $8x^3 + y^3 + 6y^2 + 12y + 8 = \dots$

$$\begin{aligned}
 &8x^3 + y^3 + 6y^2 + 12y + 8 = \\
 &8x^3 + y^3 + 3y^2 \cdot 2 + 3y \cdot 2^2 + 2^3 = \\
 &8x^3 + (y+2)^3 = \\
 &= (2x)^3 + (y+2)^3 = \\
 &(2x+(y+2)) \cdot ((2x)^2 - 2x(y+2) + (y+2)^2) = \\
 &= (2x+y+2)(4x^2 - 2xy - 4x + y^2 + 4y + 4)
 \end{aligned}$$

$$\begin{aligned}
 (x + y + z)^3 - x^3 - y^3 - z^3 &= (x + y + z)^3 - x^3 - (y^3 + z^3) = \\
 &= ((x+y+z)-x)((x+y+z)^2 + (x+y+z)x + x^2) - (y+z)(y^2 - yz + z^2) = \\
 &= (x+y+z-x)(x^2 + y^2 + z^2 + 2xy + 2zy + 2xz + x^2 + yx + zx + x^2) - (y+z)(y^2 - yz + z^2) = \\
 &= (y+z)(3x^2 + y^2 + z^2 + 3xy + 3xz + 2zy) - (y+z)(y^2 - yz + z^2) = \\
 &= (y+z)((3x^2 + y^2 + z^2 + 3xy + 3xz + 2zy) - (y^2 - yz + z^2)) = \\
 &= (y+z)(3x^2 + y^2 + z^2 + 3xy + 3xz + 2zy - y^2 + yz - z^2) = \\
 &= (y+z)(3x^2 + 3xy + 3xz + 3zy) = \\
 &= 3(y+z)(x^2 + xy + xz + zy) = \\
 &= 3(y+z)(x+y)(x+z)
 \end{aligned}$$

$$x^2 + xy + xz + zy = x(x+y) + z(x+y) = (x+y)(x+z)$$

я с друзьями на алгебре



$$1)(*) x^4 + 4 = \dots$$

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

$$\begin{aligned}
 x^4 - y^4 &= (x^2)^2 - (y^2)^2 = \\
 &= (x^2 - y^2)(x^2 + y^2)
 \end{aligned}$$

$$\begin{aligned}
 x^4 + y^4 &= \\
 x^5 + y^5 &= (x+y)(x^4 - x^3y + x^2y^2 - xy^3 + y^4) \\
 x^3 + y^3 &= (x+y)(x^2 - xy + y^2)
 \end{aligned}$$

$$x^{25} + y^{25} = \text{теорема Безу}$$

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

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

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

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

$$8x^3 = 2^3 \cdot x^3 = (2 \cdot x)^3$$

$$\begin{aligned}
 (x+y+z)^2 &= (x+y+z) \cdot (x+y+z) = \\
 &= x^2 + xy + xz + yx + y^2 + yz + zy + zx + z^2 = \\
 &= x^2 + y^2 + z^2 + 2xy + 2zy + 2xz
 \end{aligned}$$

$$1) a^2 + 2ab + b^2 = (a+b)^2$$

$$()^2 - \text{что-то}$$

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

$$ax^2 + bx + c = 0$$

$$D = b^2 - 4ac$$

$$x_{1,2} = \frac{-b \pm \sqrt{D}}{2a}$$