

Разбиение отдельных членов на слагаемые  
(как буквенных, так и числовых)

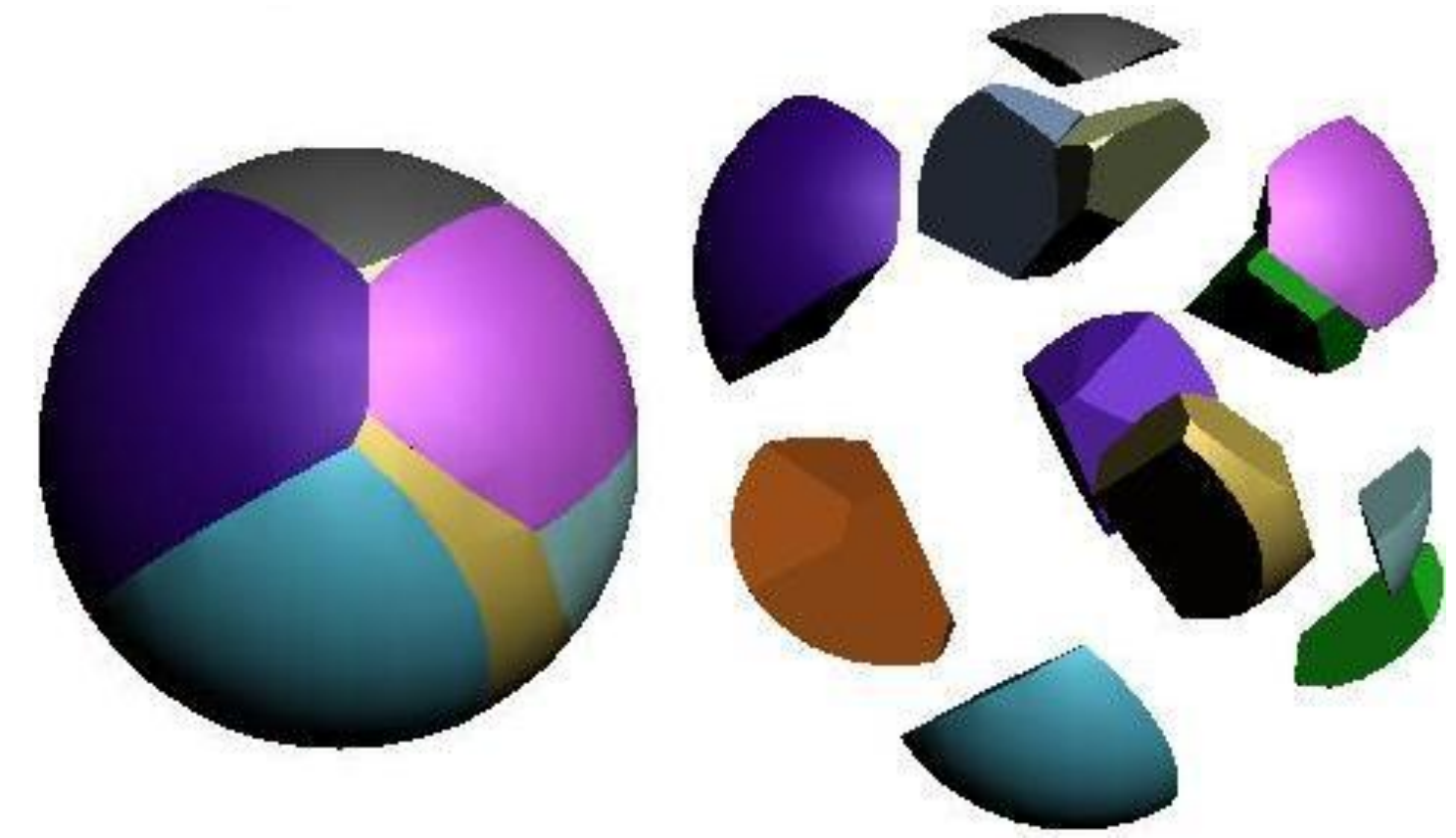
$$1) x^3 + 1991x + 1992 = 0$$

$$2) x^3 - 3x^2 + 2 = 0$$

$$3) x^4 - x^3 - 13x^2 + x + 12 = 0$$

$$4) x^3 + 4x^2 - 5 = 0$$

$$5) x^4 - x^3 - 7x^2 + x + 6 = 0$$



$$\begin{aligned} 1) x^3 + 1991x + 1992 &= 0 \\ x^3 + 1991x + 1991 + 1 &= 0 \\ (x^3 + 1) + (1991x + 1991) &= 0 \\ (x + 1)(x^2 + x + 1) + 1991(x + 1) &= 0 \\ (x^2 + x + 1992)(x + 1) &= 0 \\ x^2 + x + 1992 &= 0 \\ x &= -1 \end{aligned}$$

$$\begin{aligned} 2) x^3 - 3x^2 + 2 &= 0 \\ x^3 - 2x^2 - x^2 + 2 &= 0 \\ (x^3 - x^2) + (2 - 2x^2) &= 0 \\ x^2(x - 1) + 2(1 - x^2) &= 0 \\ x^2(x - 1) + 2(1 - x)(1 + x) &= 0 \\ (x^2 - 2 - 2x)(x - 1) &= 0 \\ x^2 - 2x - 2 &= 0 \\ D/4 = 1 + 2 = 3 \\ x_1 = (1 + \sqrt{3}) \\ x_2 = (1 - \sqrt{3}) \\ x &= 1 \end{aligned}$$

$$\begin{aligned} 4) x^3 + 4x^2 - 5 &= 0 \\ x^3 + 4x^2 - 4 - 1 &= 0 \\ (x^3 - 1) + (4x^2 - 4) &= 0 \\ (x - 1)(x^2 + x + 1) + 4(x^2 - 1) &= 0 \\ (x - 1)(x^2 + x + 1) + 4(x - 1)(x + 1) &= 0 \\ (x^2 + x + 1 + 4(x + 1))(x - 1) &= 0 \\ (x^2 + 5x + 5)(x - 1) &= 0 \\ x^2 + 5x + 5 &= 0 \\ D = 25 - 20 = 5 \\ x_2 = (-5 + \sqrt{5})/2 \\ x_3 = (-5 - \sqrt{5})/2 \\ x &= 1 \end{aligned}$$

$$\begin{aligned} 3) x^4 - x^3 - 12x^2 - 1x^2 + x + 12 &= 0 \\ (x^4 - x^3) + (-x^2 + x) + (-12x^2 + 12) &= 0 \\ x^3(x - 1) - x(x - 1) - 12(x^2 - 1) &= 0 \\ x^3(x - 1) - x(x - 1) - 12(x - 1)(x + 1) &= 0 \\ (x^3 - x - 12(x + 1))(x - 1) &= 0 \\ (x^3 - 13x - 12)(x - 1) &= 0 \\ x^3 - 13x - 12 &= 0 \\ x^3 - 12x - x - 12 &= 0 \\ (x^3 - x) + (-12x - 12) &= 0 \\ x(x^2 - 1) - 12(x - 1) &= 0 \\ x(x - 1)(x + 1) - 12(x - 1) &= 0 \\ (x(x + 1) - 12)(x - 1) &= 0 \\ (x^2 + x - 12)(x - 1) &= 0 \\ x^2 + x - 12 &= 0 \\ D = 1 + 4 * 12 = 49 \\ x_2 = (-1 + 7)/2 = 3 \\ x_3 = (-1 - 7)/2 = -4 \\ x &= 1 \\ x_1 &= 1 \end{aligned}$$

$$\begin{aligned} 5) x^4 - x^3 - 7x^2 + x + 6 &= 0 \\ (x^4 - x^3) + (-x^2 + x) + (6 - 6x^2) &= 0 \\ x^3(x - 1) - x(x - 1) - 6(x^2 - 1) &= 0 \\ x^3(x - 1) - x(x - 1) - 6(x - 1)(x + 1) &= 0 \\ (x^3 - x - 6x - 6)(x - 1) &= 0 \\ x^3 - x - 6x - 6 &= 0 \\ x(x^2 - 1) - 6(x + 1) &= 0 \\ x(x - 1)(x + 1) - 6(x + 1) &= 0 \\ (x(x - 1) - 6)(x + 1) &= 0 \\ x^2 - x - 6 &= 0 \\ x_2 &= -2 \\ x_3 &= 3 \\ x &= 1 \\ x_1 &= -1 \end{aligned}$$