

RASTAVLJANJE KVADRATNOG TRINOMA NA LINEARNE ČINIOCE

Def: Kvadratni trinom po x je izraz oblika $ax^2 + bx + c$, gdje su a, b, c brojevi i $a \neq 0$. Brojevi a, b, c nazivaju se koeficijenti kvadratanog trinoma.

Teorema: Ako su x_1 i x_2 rješenja kvadratne jednačine $ax^2 + bx + c = 0$ onda se kvadratni trinom po x : $ax^2 + bx + c$ može rastaviti na linearne činioce na sledeći način:

$$ax^2 + bx + c = a(x - x_1)(x - x_2)$$

Zadatak1: Rastaviti kvadratne trinome na linearne činioce:

a) $2x^2 - 7x + 3$; b) $6x^2 - 5x + 1$

Rješenje:

a) $2x^2 - 7x + 3 = 0$

$$x_{1,2} = \frac{7 \pm \sqrt{49 - 24}}{4} = \frac{7 \pm 5}{4}$$

$$x_1 = 3, \quad x_2 = \frac{1}{2}$$

$$\begin{aligned} 2x^2 - 7x + 3 &= a(x - x_1)(x - x_2) = 2(x - 3)\left(x - \frac{1}{2}\right) = \\ &= (x - 3)(2x - 1) \end{aligned}$$

b) $6x^2 - 5x + 1 = 0$

$$x_{1,2} = \frac{5 \pm \sqrt{25 - 24}}{12} = \frac{5 \pm 1}{12}$$

$$x_1 = \frac{1}{3}, \quad x_2 = \frac{1}{2}$$

$$\begin{aligned} 6x^2 - 5x + 1 &= 6\left(x - \frac{1}{3}\right)\left(x - \frac{1}{2}\right) = 3 \cdot 2\left(x - \frac{1}{3}\right)\left(x - \frac{1}{2}\right) = \\ &= (3x - 1)(2x - 1) \end{aligned}$$

Zadatak2: Rastaviti na linearne činioce kvadratni trinom $2x^2 + 3x - 2$.

Rješenje:

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

$$x_{1,2} = \frac{-3 \pm \sqrt{9 + 16}}{4} = \frac{-3 \pm 5}{4}$$

$$x_1 = -2, \quad x_2 = \frac{1}{2}$$

$$2x^2 + 3x - 2 = 2(x - (-2))\left(x - \frac{1}{2}\right) = (x + 2)(2x - 1)$$

Zadatak3: Rastaviti na linearne činioce kvadratni trinom $x^2 + 2x + 2$

Rješenje:

$$x^2 + 2x + 2 = 0$$

$$x_{1,2} = \frac{-2 \pm \sqrt{4 - 8}}{2} = \frac{-2 \pm \sqrt{-4}}{2} = \frac{-2 \pm 2i}{2}$$

$$x_1 = -1 + i, \quad x_2 = -1 - i$$

$$x^2 + 2x + 2 = 1 \cdot (x - (-1 + i))(x - (-1 - i)) = \\ = (x + 1 - i)(x + 1 + i)$$

Zadatak4: Skratiti razlomak: $\frac{2x^2 + 5x + 3}{x^3 + 1}, x \neq -1$

Rješenje:

$$2x^2 + 5x + 3 = 0$$

$$x_{1,2} = \frac{-5 \pm \sqrt{25 - 24}}{4} = \frac{-5 \pm 1}{4}$$

$$x_1 = -1, \quad x_2 = -\frac{3}{2}$$

$$\frac{2x^2 + 5x + 3}{x^3 + 1} = \frac{2(x + 1)(x + \frac{3}{2})}{(x + 1)(x^2 - x + 1)} = \frac{2x + 3}{x^2 - x + 1}$$