

349. Zbroj nultočaka funkcije $f(x) = (2x-5)^2 + \frac{18}{(2x-5)^2} - 11$ je jednak:

1. 8 2. 10 3. 12 4. 14

$$f(x) = (2x-5)^2 + \frac{18}{(2x-5)^2} - 11$$

$$(2x-5)^2 = t \quad \text{supstitucija}$$

$$t + \frac{18}{t} - 11 = 0 \quad / \cdot t$$

$$t^2 - 11t + 18 = 0 \quad \text{kvadratna jednadžba}$$

$$t_{1/2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{11 \pm \sqrt{11^2 - 4 \cdot 18}}{2 \cdot 1} = \frac{11 \pm \sqrt{121 - 72}}{2} = \frac{11 \pm \sqrt{49}}{2} = \frac{11 \pm 7}{2}$$

$$t_1 = \frac{11+7}{2} = \frac{18}{2}$$

$$t_1 = 9$$

$$(2x-5)^2 = 9$$

$$(2x-5)^2 - 9 = 0$$

$$(2x-5)^2 - 3^2 = 0$$

$$[(2x-5)-3][(2x-5)+3] = 0$$

$$[2x-8][2x-2] = 0$$

$$2x \cdot 8 = 0 \quad 2x = 2 / :2$$

$$2x = 8 / :2 \quad x_2 = 1$$

$$x_1 = 4$$

$$t_2 = \frac{11-7}{2} = \frac{4}{2}$$

$$t_2 = 2$$

$$(2x-5)^2 = 2$$

$$(2x)^2 - 2 \cdot 2x \cdot 5 + 5^2 = 2$$

$$4x^2 - 20x + 25 - 2 = 0$$

$$4x^2 - 20x + 23 = 0$$

$$x_{3/4} = \frac{20 \pm \sqrt{20^2 - 4 \cdot 4 \cdot 23}}{4 \cdot 2}$$

$$= \frac{20 \pm \sqrt{400 - 360}}{8} = \frac{20 \pm \sqrt{32}}{8}$$

$$= \frac{20 \pm 4\sqrt{2}}{8} = \frac{5 \pm \sqrt{2}}{2}$$

$$x_3 = \frac{5 + \sqrt{2}}{2}$$

$$x_4 = \frac{5 - \sqrt{2}}{2}$$

zbroj nultočaka:

$$\begin{aligned} x_1 + x_2 + x_3 + x_4 &= 4 + 1 + \frac{5 + \sqrt{2}}{2} + \frac{5 - \sqrt{2}}{2} = 5 + \frac{5 + \sqrt{2} + 5 - \sqrt{2}}{2} \\ &= 5 + \frac{10}{2} = 5 + 5 = 10 \end{aligned}$$