

1. Riješi jednačinu

$$a) 3x^2 - 4x = 0$$

$$x(3x-4) = 0$$

$$x = 0 \quad (+1)$$

$$3x-4=0$$

$$3x = 4 / :3$$

$$x = \frac{4}{3} \quad (+1)$$

$$b) 3x^2 - \frac{1}{3} = 0$$

$$3x^2 = \frac{1}{3} / :3$$

$$x^2 = \frac{1}{9} / \sqrt{\quad} \rightarrow \frac{\sqrt{1}}{\sqrt{9}} \cdot \frac{\sqrt{9}}{\sqrt{9}} = \frac{\sqrt{9}}{9}$$

$$x = \pm \frac{\sqrt{9}}{9} \quad (+1)$$

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

$$x_{1,2} = \frac{2 \pm \sqrt{4 + 60}}{10}$$

$$x_{1,2} = \frac{2 \pm \sqrt{64}}{10} = \frac{2 \pm 8}{10}$$

$$x_1 = 1$$

$$x_2 = -\frac{3}{5}$$

2. Riješi sledeće jednačine.

$$bx^2 - (a-b)x - a = 0$$

$$x_{1,2} = \frac{a-b \pm \sqrt{(a-b)^2 + 4a}}{2b} \quad (+1)$$

$$x_{1,2} = \frac{a-b \pm \sqrt{a^2 + 2ab + b^2 + 4ab}}{2b} = \frac{a-b \pm \sqrt{a^2 + 2ab + b^2}}{2b}$$

$$= \frac{a-b \pm \sqrt{(a+b)^2}}{2b} = \frac{a-b \pm (a+b)}{2b} = \frac{a-b \pm (a+b)}{2b} \quad (+1)$$

$$x_1 = \frac{a-b + a+b}{2b} = \frac{2a}{2b} = \frac{a}{b}$$

$$x_2 = \frac{a-b - a-b}{2b} = \frac{-2b}{2b} = -1$$

Ukupno: 3 boda

3. Riješi jednačinu:

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

$$x \geq 0$$

$$x < 0 \quad (+1)$$

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

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

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

$$x^2 - x - 1 = 0$$

$$x_{1,2} = \frac{1 \pm \sqrt{1+4}}{2}$$

$$x_{1,2} = \frac{-1 \pm \sqrt{1+20}}{2}$$

$$x_{3,4} = \frac{1 \pm \sqrt{5}}{2} \quad x < 2$$

$$x_{1,2} = \frac{-1 \pm \sqrt{21}}{2}$$

$$x_1 = \frac{-1 + \sqrt{21}}{2} \quad x \geq 2$$

$$\text{Rješenje: } x_{3,4} = \frac{1 \pm \sqrt{5}}{2} \quad (+1)$$

$$x_2 = \frac{-1 - \sqrt{21}}{2} \quad x \geq 2$$

4. $\left(\frac{2x-1}{x+1}\right)^2 - 3\left(\frac{2x-1}{x+1}\right) - 4 = 0$

$$t = \frac{2x-1}{x+1} \quad (+1)$$

$$t^2 - 3t - 4 = 0$$

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

$$t_1 = 4$$

$$t_2 = -1$$

(+1)

UKUPNO: 10 bodova

5. Zbroj dvanaerki dvoznamenkastog broja je 8, a umnoatak 15. Koji je taj broj?

$$x + y = 8 \rightarrow x = 8 - y$$

$$x \cdot y = 15 \quad (+1)$$

$$(8 - y) \cdot y = 15$$

$$8y - y^2 = 15$$

$$8y - y^2 - 15 = 0 \quad (-1) \quad (+1)$$

$$-8y + y^2 + 15 = 0$$

$$\begin{array}{cc} & \backslash \\ -3 & -5 \end{array}$$

$$y_1 = 3 \quad x_1 = 8 - 3 = 5 \rightarrow 53 \quad (+1)$$

$$y_2 = 5 \quad x_2 = 8 - 5 = 3 \rightarrow 35$$

Rjesenje: 53, 35

6. Ukoliko Ahilej i Patroklos rade zajedno, obave neki posao za 12 sati. Ahilej bi, radeći sam, obavio isti posao za 18 sati kraće nego kada bi taj posao sam radio Patroklos. Za koliko bi sati posao obavio svatko od njih radeći sam?

zajedno $\rightarrow 12$ h

Patroklos $\rightarrow x$ h

Ahilej $\rightarrow x - 18$ h

(+1)

$\frac{1}{x}$ posla

$\frac{1}{x-18}$ posla

$$\frac{1}{x} + \frac{1}{x-18} = \frac{1}{12}$$

$$12 \left(\frac{1}{x} + \frac{1}{x-18} \right) = 1$$

$$\frac{12}{x} + \frac{12}{x-18} = 1 \quad / \cdot (x-18) \cdot x$$

$$\begin{array}{l} x-18 \neq 0 \\ x \neq 18 \end{array}$$

$$12(x-18) + 12x = x(x-18)$$

$$12x - 216 + 12x = x^2 - 18x \quad (+1)$$

$$x^2 - 42x + 216 = 0$$

$$x_{1,2} = \frac{42 \pm \sqrt{1764 - 864}}{2}$$

$$x = \frac{42 \pm 30}{2}$$

$$x_1 = 6$$

$$x_2 = 36 \quad (+1)$$

UKUPNO: 6

7. Ne rješavajući sljedeće jednačbe odredi njihova rješenja

a) $x^2 + 7x + 10 = 0$

$\begin{matrix} / & \backslash \\ 2 & 5 \end{matrix}$ (+1)

$x_1 = -2$

$x_2 = -5$ (+1)

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

$\begin{matrix} / & \backslash \\ -1 & -3 \end{matrix}$ (+1)

(4)

$x_1 = 1$

$x_2 = 3$ (+1)

8. Ne rješavajući kvadratnu jednačbu $5x^2 - x + 2 = 0$ izračunaj:

a) $\frac{1}{x_1} + \frac{1}{x_2}$

b) $x_1^2 + x_2^2$

(2)

a) $x_1 \cdot x_2 = \frac{2}{5}$

$x_1 + x_2 = -\frac{(-1)}{5} = \frac{1}{5}$ (+1)

$\frac{1}{x_1} + \frac{1}{x_2} = \frac{x_1 + x_2}{x_1 \cdot x_2} = \frac{\frac{1}{5}}{\frac{2}{5}} = \frac{1}{2}$ (+1)

9. Rješi sljedeće jednačbe:

$x^3 - 1 = 0$

(3)

$(x-1)(x^2 + x + 1)$

$x_1 - 1 = 0$

$x_1 = 1$

$x^2 + x + 1 = 0$ (+1)

$x_{2,3} = \frac{-1 \pm \sqrt{1-4}}{2} = \frac{-1 \pm \sqrt{-3}}{2} = \frac{-1 \pm i\sqrt{3}}{2}$ (+1)

$x_2 = \frac{-1 - i\sqrt{3}}{2}$

(+1)

$x_3 = \frac{-1 + i\sqrt{3}}{2}$

UKUPNO: 9

