

ECUAȚIA DE GRADUL al II-lea

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

$$a=1 \quad b=-3 \quad c=-4$$

$$\textcircled{V1} \quad \Delta = b^2 - 4ac$$

$$\Delta = (-3)^2 - 4 \cdot 1 \cdot (-4)$$

$$\Delta = 9 + 16 = 25$$

$$\sqrt{\Delta} = \sqrt{25} = 5$$

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

$$x_{1,2} = \frac{-(-3) \pm 5}{2 \cdot 1}$$

$$x_1 = \frac{3+5}{2} = \frac{8}{2} = 4$$

$$x_2 = \frac{3-5}{2} = \frac{-2}{2} = -1$$

$$S = \{4; -1\}$$

$$3x^2 - 25 = 0 \Leftrightarrow$$

$$\textcircled{V1} \quad 3x^2 = 25 \Leftrightarrow$$

$$x^2 = \frac{25}{3} \Leftrightarrow$$

$$\sqrt{x^2} = \sqrt{\frac{25}{3}} \Leftrightarrow$$

$$|x| = \frac{\sqrt{25}}{\sqrt{3}} \Leftrightarrow$$

$$|x| = \frac{5}{\sqrt{3}} \Leftrightarrow |x| = \frac{5\sqrt{3}}{3}$$

\Downarrow

$$x = \frac{5\sqrt{3}}{3} \text{ sau } x = -\frac{5\sqrt{3}}{3} \Rightarrow S = \left\{ \frac{5\sqrt{3}}{3}, -\frac{5\sqrt{3}}{3} \right\}$$

$$\textcircled{V2} \quad 3x^2 - 25 = 0 \Leftrightarrow (\sqrt{3}x)^2 - 5^2 = 0 \Leftrightarrow$$

$$(\sqrt{3}x - 5) \cdot (\sqrt{3}x + 5) = 0 \Leftrightarrow \sqrt{3}x - 5 = 0 \text{ sau } \sqrt{3}x + 5 = 0$$

$$\Leftrightarrow \sqrt{3}x = 5 \text{ sau } \sqrt{3}x = -5 \Rightarrow x = \frac{5\sqrt{3}}{3} \text{ sau } x = -\frac{5\sqrt{3}}{3}$$

$$\textcircled{V2} \quad x^2 - 3x - 4 = 0 \Leftrightarrow x + x - 4x - 4 = 0 \Leftrightarrow x(x+1) - 4(x+1) = 0$$

$$\Leftrightarrow (x+1)(x-4) = 0 \Leftrightarrow \left. \begin{array}{l} x+1=0 \\ x=-1 \end{array} \right\} \text{ sau } \left. \begin{array}{l} x-4=0 \\ x=4 \end{array} \right\} \Rightarrow S = \{-1; 4\}$$

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

$$a=1, b=-1, c=-1$$

$$\Delta = b^2 - 4ac$$

$$\Delta = (-1)^2 - 4 \cdot 1 \cdot (-1)$$

$$\Delta = 1 + 4 = 5 \Rightarrow \sqrt{\Delta} = \sqrt{5}$$

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

$$x_{1,2} = \frac{-(-1) \pm \sqrt{5}}{2 \cdot 1}$$

$$x_{1,2} = \frac{1 \pm \sqrt{5}}{2}$$

$$2x^2 + 7 = 0$$

$$\textcircled{V1} \quad 2x^2 + 7 = 0 \Leftrightarrow 2x^2 = -7 \Leftrightarrow$$

$$x^2 = -\frac{7}{2}$$

$$x^2 \geq 0, (\forall) x \in \mathbb{R} \Rightarrow S = \emptyset$$

$$-\frac{7}{2} < 0$$

$$\textcircled{V2} \quad 2x^2 + 7 = 0 \Leftrightarrow 2x^2 + 0 \cdot x + 7 = 0$$

$$a=2, b=0, c=7 \quad \Delta = b^2 - 4ac$$

$$\Delta = 0^2 - 4 \cdot 2 \cdot 7$$

$$\Delta = -28 \Rightarrow \Delta < 0 \Rightarrow S = \emptyset$$

$$3x^2 - 5x = 0 \Leftrightarrow$$

$$x \cdot (3x - 5) = 0 \Leftrightarrow$$

$$x = 0 \text{ sau } 3x - 5 = 0$$

$$x = \frac{5}{3}$$

$$S = \{0; \frac{5}{3}\}$$

$$x_1 = \frac{1 + \sqrt{5}}{2}$$

$$x_2 = \frac{1 - \sqrt{5}}{2}$$

$$\Rightarrow S = \left\{ \frac{1 + \sqrt{5}}{2}; \frac{1 - \sqrt{5}}{2} \right\}$$

$$\textcircled{V2} \quad 3x^2 - 5x = 0 \Leftrightarrow 3 \cdot x^2 + (-5) \cdot x + 0 = 0$$

$$a = +3 \quad b = -5 \quad c = 0 \rightarrow \Delta = b^2 - 4ac = (-5)^2 - 4 \cdot 3 \cdot 0$$

$$\Delta = 25 - 0 = 25 \Rightarrow \sqrt{\Delta} = \sqrt{25} = 5$$

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

$$x_{1,2} = \frac{-(-5) \pm 5}{2 \cdot 3} = \frac{5 \pm 5}{6} \Rightarrow \left\{ \begin{array}{l} x_1 = \frac{5-5}{6} = \frac{0}{6} = 0 \\ x_2 = \frac{5+5}{6} = \frac{10}{6} = \frac{5}{3} \end{array} \right\} \Rightarrow S = \left\{ 0; \frac{5}{3} \right\}$$

$$-2x^2 + x - 1 = 0 \quad | \cdot (-1) \Leftrightarrow 2x^2 - x + 1 = 0 \quad \left. \begin{array}{l} a=2 \quad b=-1 \quad c=1 \end{array} \right\} \Rightarrow$$

$$\Delta = b^2 - 4ac = (-1)^2 - 4 \cdot 2 \cdot 1 = 1 - 8 = -7$$

$$\Delta < 0 \Rightarrow S = \emptyset$$

$$(x+2)^2 - 5x = 6 \Leftrightarrow x^2 + 2 \cdot 2 \cdot x + 2^2 - 5x - 6 = 0 \Leftrightarrow$$

$$x^2 + 4x + 4 - 5x - 6 = 0 \Leftrightarrow x^2 - x - 2 = 0 \quad \left. \begin{array}{l} \Delta = b^2 - 4ac \\ a=1 \quad b=-1 \quad c=-2 \end{array} \right\} \Rightarrow \Delta = (-1)^2 - 4 \cdot 1 \cdot (-2)$$

$$\Delta = 1 + 8 = 9 \Rightarrow \sqrt{\Delta} = \sqrt{9} = 3 \Rightarrow x_{1,2} = \frac{-(-1) \pm 3}{2 \cdot 1} = \frac{1 \pm 3}{2} = \left\{ \begin{array}{l} \frac{1-3}{2} = -1 \\ \frac{1+3}{2} = 2 \end{array} \right.$$

$$\Rightarrow S = \{-1; 2\}$$

$$\textcircled{V2} \quad x^2 - x - 2 = 0 \Leftrightarrow \underbrace{x^2 - 2x + x - 2 = 0} \Leftrightarrow x(x-2) + 1 \cdot (x-2) = 0 \Leftrightarrow$$

$$(x-2)(x+1) = 0 \Leftrightarrow \begin{array}{l} x-2=0 \\ x=2 \end{array} \text{ ou } \begin{array}{l} x+1=0 \\ x=-1 \end{array} \Rightarrow S = \{2; -1\}$$