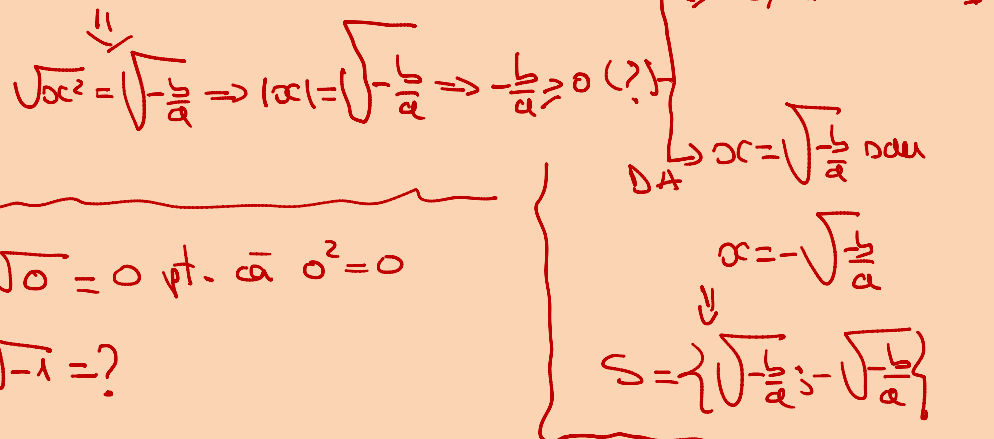
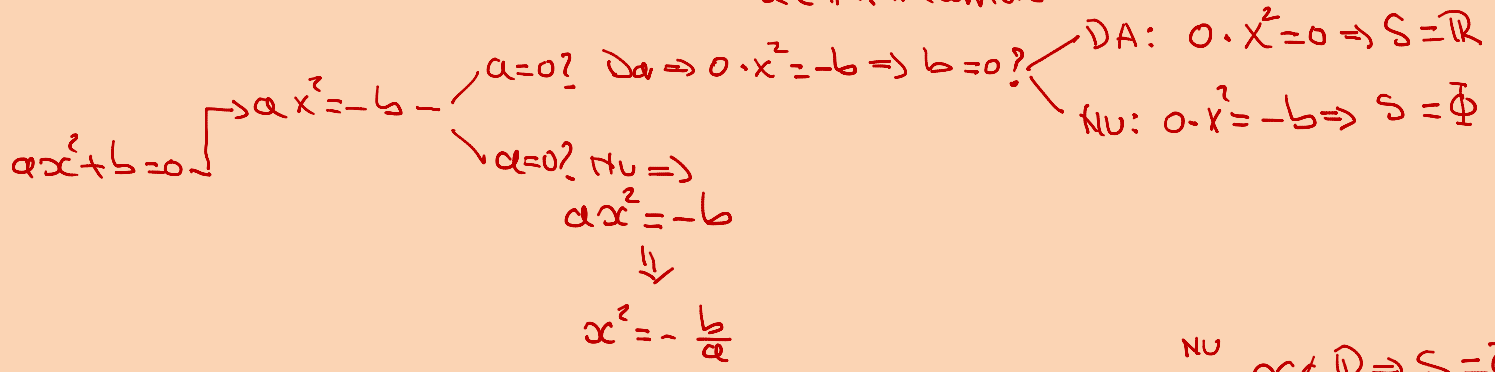


Rezolvarea ecuației $ax^2 + b = 0$, $a \in \mathbb{R}, b \in \mathbb{R}$: coeficienți;
 $x \in \mathbb{R}$: necunoscuta (variabilă)



$\sqrt{9} = 3$ pt. că $3^2 = 9$ $\sqrt{0} = 0$ pt. că $0^2 = 0$
 $\sqrt{25} = 5$ pt. că $5^2 = 25$ $\sqrt{-1} = ?$

$\sqrt{-1} = 1$ (FALS) pt. că $1^2 \neq -1$
 $\sqrt{-1} = -1$ (FALS) pt. că $(-1)^2 = 1 \neq -1$

$\Rightarrow \sqrt{-1} = \text{un multiplu de număr}$
 $\sqrt{-1} \notin \mathbb{R}$

APLICAȚII

$3x^2 = 3x^2 \Rightarrow 3x^2 - 3x^2 = 0 \Rightarrow 0 \cdot x^2 = 0 \Rightarrow S = \mathbb{R}$

$2x^2 + 1 = 2x^2 + 3 \Rightarrow 2x^2 - 2x^2 = 3 - 1 \Rightarrow 0 \cdot x^2 = 2 \Rightarrow S = \emptyset$

ATENȚIE!

$0 \cdot x^2 = 0 \Rightarrow x^2 = \frac{0}{0}$

$0 \cdot x^2 = 2 \Rightarrow x^2 = \frac{2}{0}$

$2 \cdot x^2 - 25 = 25 \Leftrightarrow 2x^2 = 25 + 25 \Leftrightarrow 2x^2 = 50 \Leftrightarrow x^2 = \frac{50}{2} \Leftrightarrow x^2 = 25 \Leftrightarrow \sqrt{x^2} = \sqrt{25} \Leftrightarrow$

$|x| = 5 \Rightarrow \begin{cases} x = 5 \\ \text{sau} \\ x = -5 \end{cases} \Rightarrow S = \{5; -5\}$

$7x^2 + 7 = 7 \Leftrightarrow 7x^2 = 7 - 7 \Leftrightarrow 7x^2 = 0 \Leftrightarrow x^2 = \frac{0}{7} \Leftrightarrow x^2 = 0 \Leftrightarrow \sqrt{x^2} = \sqrt{0} \Leftrightarrow |x| = 0 \Rightarrow$

$x = 0 \Rightarrow S = \{0\}$

$x^2 + 2 = 1 \Leftrightarrow x^2 = 1 - 2 \Leftrightarrow x^2 = -1$

$\left. \begin{matrix} x^2 \geq 0 \\ -1 < 0 \end{matrix} \right\} \text{imposibil} \Rightarrow S = \emptyset$

$$49x^2 - 24 = 0 \Leftrightarrow 49x^2 = 24 \Leftrightarrow x = \frac{\sqrt{24}}{49} \Leftrightarrow x = \frac{\sqrt{6}}{49} \Leftrightarrow x = \frac{\sqrt{6}}{49}$$

$$|x| = \frac{\sqrt{24}}{\sqrt{49}} \Leftrightarrow |x| = \frac{2\sqrt{6}}{7} \Rightarrow \left\{ \begin{array}{l} x = \frac{2\sqrt{6}}{7} \\ \text{sau } x = -\frac{2\sqrt{6}}{7} \end{array} \right\} \Rightarrow \left\{ \frac{2\sqrt{6}}{7}, -\frac{2\sqrt{6}}{7} \right\}$$

$$\begin{array}{r|l} 3 & 3 \\ 1 & 1 \\ \hline 24 & 2 \\ 12 & 2 \\ 6 & 2 \end{array} \textcircled{2}$$

$$2x^2 - 0,13 = 0 \Leftrightarrow$$

$$0,13 = \frac{13}{100} = \frac{1}{3}$$

$$2x^2 - \frac{1}{3} = 0 \Leftrightarrow 2x^2 = \frac{1}{3} \Leftrightarrow x^2 = \frac{1}{3} : 2 \Leftrightarrow$$

$$x^2 = \frac{1}{3} \cdot \frac{1}{2} \Leftrightarrow x^2 = \frac{1}{6} \Leftrightarrow \sqrt{x^2} = \sqrt{\frac{1}{6}} \Leftrightarrow |x| = \frac{\sqrt{1}}{\sqrt{6}} \Leftrightarrow |x| = \frac{1}{\sqrt{6}} \Rightarrow$$

$$x = \frac{1}{\sqrt{6}} \text{ sau } x = -\frac{1}{\sqrt{6}} \Rightarrow S = \left\{ \frac{1}{\sqrt{6}}, -\frac{1}{\sqrt{6}} \right\}$$

știind că:

b) $\frac{4x}{27} = \frac{3}{x}$;

c) $\frac{3x}{16} = \frac{1}{27x}$;

e) $\frac{9}{5x} = \frac{20x}{4}$;

f) $\frac{4}{6x} = \frac{54x}{25}$.

$$\frac{4x}{27} = \frac{3}{x} \Leftrightarrow 4x \cdot x = 27 \cdot 3 \Leftrightarrow 4x^2 = 81 \Leftrightarrow x^2 = \frac{81}{4} \Leftrightarrow \sqrt{x^2} = \sqrt{\frac{81}{4}} \Leftrightarrow |x| = \frac{9}{2}$$

P.r. $x \neq 0$

$$x = \frac{9}{2} \text{ sau } x = -\frac{9}{2}$$

$$S = \left\{ \frac{9}{2}, -\frac{9}{2} \right\}$$

$$\frac{9}{5x} = \frac{20x}{4} \Rightarrow 9 \cdot 4 = 5x \cdot 20x \Leftrightarrow 36 = 100x^2$$

$$x^2 = \frac{36}{100} \Rightarrow \sqrt{x^2} = \sqrt{\frac{36}{100}} \Rightarrow |x| = \frac{6}{10}$$

$$\left\{ \begin{array}{l} x = \frac{6}{10} \\ \text{sau} \\ x = -\frac{6}{10} \end{array} \right.$$

$$S = \left\{ \frac{6}{10}, -\frac{6}{10} \right\}$$

$$\frac{4}{6x} = \frac{54x}{25} \Rightarrow 4 \cdot 25 = 6x \cdot 54x$$

P.r. $6x \neq 0 \Rightarrow x \neq 0$

$$6 \cdot 54x^2 = 4 \cdot 25 \Rightarrow x^2 = \frac{4 \cdot 25}{6 \cdot 54} \Rightarrow x^2 = \frac{100}{324} \Rightarrow \sqrt{x^2} = \sqrt{\frac{100}{324}} \Rightarrow$$

$$\text{SAU } x^2 = \frac{4 \cdot 25}{6 \cdot 54} \Rightarrow x^2 = \frac{25}{81} \Rightarrow x = \sqrt{\frac{25}{81}}$$

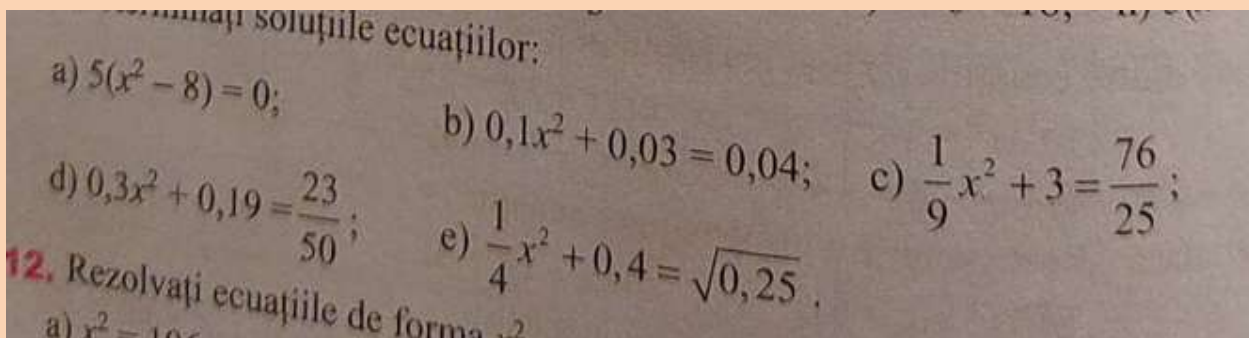
$$|x| = \frac{5}{9} \Rightarrow x = \pm \frac{5}{9} \Rightarrow S = \left\{ \pm \frac{5}{9} \right\}$$

$$B. (x+2)^2 = 48 \Leftrightarrow (x+2)^2 = \frac{48}{3} \Leftrightarrow (x+2)^2 = 16 \Leftrightarrow \sqrt{(x+2)^2} = \sqrt{16} \Leftrightarrow |x+2| = 4$$

$$\Rightarrow \left. \begin{array}{l} x+2=4 \Rightarrow x=4-2 \Rightarrow x=2 \\ \text{sau} \\ x+2=-4 \Rightarrow x=-4-2 \Rightarrow x=-6 \end{array} \right\} \Rightarrow S = \{2; -6\}$$

$$6. (x-2)^2 = 54 \Leftrightarrow (x-2)^2 = \frac{54}{6} \Leftrightarrow \sqrt{(x-2)^2} = \sqrt{9} \Leftrightarrow |x-2| = 3 \left\{ \begin{array}{l} x-2=3 \\ \text{sau} \\ x-2=-3 \end{array} \right.$$

$$\Rightarrow \left\{ \begin{array}{l} x=3+2 \Rightarrow x=5 \\ x=-3+2 \Rightarrow x=-1 \end{array} \right. \Rightarrow S = \{5; -1\}$$



$$5. (x^2 - 8) = 0 \Leftrightarrow x^2 - 8 = 0 \Leftrightarrow x^2 = 8 \Leftrightarrow \sqrt{x^2} = \sqrt{8} \Leftrightarrow |x| = 2\sqrt{2} \Leftrightarrow$$

$$x = 2\sqrt{2} \text{ sau } x = -2\sqrt{2} \Rightarrow S = \{2\sqrt{2}, -2\sqrt{2}\}$$

$$0,1x^2 + 0,03 = 0,04 \Rightarrow \frac{1}{10} \cdot x^2 + \frac{3}{100} = \frac{4}{100} \quad | \cdot 100 \Rightarrow \frac{1}{10} \cdot x^2 \cdot 100 + \frac{3}{100} \cdot 100 = \frac{4}{100} \cdot 100$$

$$\Leftrightarrow 10x^2 + 3 = 4 \Rightarrow 10x^2 = 4 - 3 \Leftrightarrow 10x^2 = 1 \Rightarrow x^2 = \frac{1}{10} \Rightarrow \sqrt{x^2} = \sqrt{\frac{1}{10}} \Rightarrow$$

$$|x| = \frac{1}{\sqrt{10}} \Rightarrow |x| = \frac{\sqrt{10}}{10} \Rightarrow \left\{ \begin{array}{l} x = \frac{\sqrt{10}}{10} \\ \text{sau} \\ x = -\frac{\sqrt{10}}{10} \end{array} \right. \Rightarrow S = \left\{ \frac{\sqrt{10}}{10}, -\frac{\sqrt{10}}{10} \right\}$$

$$0,3 \cdot x^2 + 0,19 = \frac{23}{50} \Leftrightarrow \frac{3}{10} \cdot x^2 + \frac{19}{100} = \frac{46}{100} \quad | \cdot 100 \Rightarrow 30x^2 + 19 = 46 \Leftrightarrow$$

$$30x^2 = 46 - 19 \Leftrightarrow 30x^2 = 27 \Leftrightarrow x^2 = \frac{27}{30} \Rightarrow x^2 = \frac{9}{10} \Rightarrow \sqrt{x^2} = \sqrt{\frac{9}{10}} \Rightarrow$$

$$|x| = \frac{3}{\sqrt{10}} \Rightarrow |x| = \frac{3\sqrt{10}}{10} \Rightarrow x = \pm \frac{3\sqrt{10}}{10} \Rightarrow S = \left\{ \pm \frac{3\sqrt{10}}{10} \right\}$$

$$\frac{1}{4} \cdot x^2 + 0,4 = \sqrt{0,25} \Rightarrow \frac{1}{4} \cdot x^2 + \frac{4}{10} = \sqrt{\frac{25}{100}} \Rightarrow \frac{1}{4} \cdot x^2 = \frac{5}{10} - \frac{4}{10} \Rightarrow \frac{1}{4} \cdot x^2 = \frac{1}{10} \Rightarrow$$

$$x^2 = \frac{1}{10} : \frac{1}{4} \Rightarrow x^2 = \frac{1}{10} \cdot \frac{4}{1} \Rightarrow x^2 = \frac{4}{10} \Rightarrow \sqrt{x^2} = \sqrt{\frac{2}{5}} \Rightarrow |x| = \frac{\sqrt{2}}{\sqrt{5}} \Rightarrow |x| = \frac{\sqrt{10}}{5}$$

$$\Rightarrow x = \frac{\sqrt{10}}{5} \text{ atau } x = -\frac{\sqrt{10}}{5} \Rightarrow S = \left\{ \frac{\sqrt{10}}{5}, -\frac{\sqrt{10}}{5} \right\}$$

$$\frac{1}{25} \cdot x^2 - 0,04 = \sqrt{0,16} \Leftrightarrow \frac{1}{25} \cdot x^2 - \frac{4}{100} = \sqrt{\frac{16}{100}} \Leftrightarrow \frac{1}{25} \cdot x^2 = \frac{4}{10} + \frac{4}{100} \Leftrightarrow$$

$$\frac{1}{25} \cdot x^2 = \frac{40}{100} + \frac{4}{100} \Leftrightarrow \frac{1}{25} \cdot x^2 = \frac{36}{100} \Rightarrow x^2 = \frac{36}{100} : \frac{1}{25} \Rightarrow x^2 = \frac{36}{100} \cdot \frac{25}{1}$$

$$x^2 = 9 \Rightarrow \sqrt{x^2} = \sqrt{9} \Rightarrow |x| = 3 \Rightarrow \left. \begin{array}{l} x = 3 \\ \text{atau} \\ x = -3 \end{array} \right\} \Rightarrow S = \{3, -3\}$$

$$2x^2 + 1 = 0,8 \Leftrightarrow 2x^2 = 0,8 - 1 \Leftrightarrow 2x^2 = -0,2 \Leftrightarrow x^2 = -\frac{2}{10} \cdot \frac{1}{2} \Leftrightarrow x^2 = -\frac{1}{5} \cdot \frac{1}{2} \Rightarrow x^2 = -\frac{1}{10}$$

$$\text{SAU } 2x^2 = \frac{4}{5} - \frac{1}{1} \Leftrightarrow 2x^2 = \frac{4}{5} - \frac{5}{5} \Leftrightarrow 2x^2 = \frac{4-5}{5} \Leftrightarrow 2x^2 = -\frac{1}{5} \Leftrightarrow x^2 = -\frac{1}{5} : \frac{2}{2} \Leftrightarrow$$

$$x^2 = -\frac{1}{5} \cdot \frac{1}{2} \Rightarrow x^2 = -\frac{1}{10}$$

$$\left. \begin{array}{l} x^2 \geq 0, (\forall) x \in \mathbb{R} \\ -\frac{1}{10} < 0 \end{array} \right\} \Rightarrow S = \emptyset$$

(V1)

$$\frac{x^2+4x}{8} = \frac{2x+8}{4} \Leftrightarrow \frac{x^2+4x}{8} = \frac{2 \cdot (x+4)}{4 \cdot 2} \Rightarrow \frac{x^2+4x}{8} = \frac{x+4}{2} \Rightarrow (x^2+4x) \cdot 2 = 8 \cdot (x+4) \Rightarrow$$

$$2x^2 + 8x = 8x + 32 \Leftrightarrow 2x^2 + 8x - 8x = 32$$

$$2x^2 = 32 \Rightarrow x^2 = \frac{32}{2} \Rightarrow x^2 = 16 \Rightarrow \sqrt{x^2} = \sqrt{16} \Rightarrow |x| = 4$$

$$x = 4 \text{ dan } x = -4 \rightarrow S = \{4, -4\}$$

(V2)

$$\frac{x^2+4x}{8} = \frac{2x+8}{4} \Leftrightarrow \frac{x^2+4x}{8} = \frac{4x+16}{8}$$

$$x^2+4x = 4x+16 \Leftrightarrow x^2+4x-4x = 16 \Leftrightarrow$$

$$x^2 = 16 \Rightarrow \sqrt{x^2} = \sqrt{16} \Rightarrow x = \pm 4 \Rightarrow S = \{\pm 4\}$$

$$\frac{2x+8}{4} = \frac{2 \cdot (2x+8)}{2 \cdot 4} = \frac{4x+16}{8}$$

Atentio:

$$\frac{2x+8}{4} = \frac{4x+8}{8}$$

...