

NR. REAȚIE-APLICAȚII: $a \in \mathbb{R}, b \in \mathbb{R}$

$$\min(a, b) = \begin{cases} a, & \text{dacă } a \leq b \\ b, & \text{dacă } b \leq a \end{cases} \quad \max(a, b) = \begin{cases} a, & \text{dacă } a \geq b \\ b, & \text{dacă } b \geq a \end{cases}$$

Ex:

$$\min\left(-\frac{5}{6}; -\frac{7}{8}\right) = A \Rightarrow A = ?$$

$$\left\{ \begin{array}{l} -1 < 10 \mid \cdot (-1) \\ 1 > -10 \end{array} \right.$$

Comparăm: $-\frac{5}{6} \text{ cu } -\frac{7}{8}$: $\frac{5 \cdot 8}{40} < \frac{6 \cdot 7}{42} \Rightarrow \frac{5}{6} < \frac{7}{8} \mid \cdot (-1)$

$$-\frac{5}{6} > -\frac{7}{8} \Rightarrow A = -\frac{7}{8} \quad \left\{ \begin{array}{l} \frac{5}{6} = \frac{20}{24} \quad \frac{7}{8} = \frac{21}{24} \\ -\frac{20}{24} > -\frac{21}{24} \end{array} \right.$$

$$\max\left(\frac{4}{3}, \frac{7}{6}\right) = B \quad \frac{4 \cdot 6}{24} > \frac{7 \cdot 4}{21} \Rightarrow \frac{4}{3} > \frac{7}{6} \Rightarrow B = \frac{4}{3}$$

$$\min\left(\frac{1997}{1996}, \frac{2997}{2998}\right) = C \quad \left\{ \begin{array}{l} 1997 > 1996 \Rightarrow \frac{1997}{1996} > 1 \\ 2997 < 2998 \Rightarrow \frac{2997}{2998} < 1 \end{array} \right.$$

$$\Rightarrow \frac{2997}{2998} < \frac{1997}{1996} \Rightarrow C = \frac{2997}{2998}$$

$$\max(\underbrace{2\sqrt{75} - \sqrt{80}}_a; \underbrace{\sqrt{48} - \sqrt{405}}_b) = D \Rightarrow D = ?$$

$$2\sqrt{75} = \sqrt{300}; \quad 300 > 80 \Rightarrow \sqrt{300} > \sqrt{80} \Rightarrow \sqrt{300} - \sqrt{80} > 0 \Rightarrow a > 0$$

$$48 < 405 \Rightarrow \sqrt{48} < \sqrt{405} \Rightarrow \sqrt{48} - \sqrt{405} < 0 \Rightarrow b < 0$$

$$\begin{matrix} a > 0 \\ b < 0 \end{matrix} \Rightarrow a > b \Rightarrow \Delta = a = 2\sqrt{75} - \sqrt{80}$$

$$\min \left(\underbrace{\sqrt{363} + \sqrt{400}}_a; \underbrace{\sqrt{243} + \sqrt{289}}_b \right) = T$$

$$\begin{matrix} a = 11\sqrt{3} + 20 \\ b = 9\sqrt{3} + 17 \end{matrix} \left\{ \begin{array}{l} 11\sqrt{3} > 9\sqrt{3} \\ 20 > 17 \end{array} \right\} \Rightarrow 11\sqrt{3} + 20 > 9\sqrt{3} + 17 \Rightarrow a > b \Rightarrow T = b$$

$$\max \left(\underbrace{3\sqrt{5} - 2\sqrt{3}}_a; \underbrace{7\sqrt{5} + 3\sqrt{3}}_b \right) = A \Rightarrow A = ?$$

$$a < b \Leftrightarrow 3\sqrt{5} - 2\sqrt{3} < 7\sqrt{5} + 3\sqrt{3} \Leftrightarrow$$

$$3\sqrt{5} - 7\sqrt{5} < 3\sqrt{3} + 2\sqrt{3} \Leftrightarrow -2\sqrt{5} < 5\sqrt{3} (A) \Rightarrow$$

$$a < b (A) \Rightarrow A = 7\sqrt{5} + 3\sqrt{3}$$

Determinați valorile nr. real x astfel încât:

$$\begin{array}{l} 1) |x| = |-x| \\ 2) |x| = -|x| \\ 3) |x| > -|x| \\ 4) |x| = 3\sqrt{5} - 2\sqrt{3} \\ 5) |x| = 3\sqrt{2} - 2\sqrt{6} \end{array} \left\{ \begin{array}{l} 1) |-x| = |(-1) \cdot x| = |-1| \cdot |x| = 1 \cdot |x| = |x| \\ \text{adevărat, } (\forall) x \in \mathbb{R} \\ 2) \text{ Dacă } x = 0 \Rightarrow |0| = -0 = +0 = 0 \\ |x| = -|x| \Leftrightarrow x = 0 \\ 3) |x| \geq 0, (\forall) x \in \mathbb{R} \\ -|x| \leq 0, (\forall) x \in \mathbb{R} \end{array} \right. \left\{ \begin{array}{l} |0| = 0 \\ -|0| = -0 = +0 = 0 \\ |x| = -|x| \Leftrightarrow x = 0 \\ |x| = -|x| \Leftrightarrow \\ x = 0 \end{array} \right.$$

$$\left. \begin{array}{l} 3) |x| \geq 0, (\forall) x \in \mathbb{R} \\ -|x| \leq 0, (\forall) x \in \mathbb{R} \end{array} \right\} \Rightarrow \left\{ \begin{array}{l} |x| \geq -|x|, (\forall) x \in \mathbb{R} \Rightarrow \\ |x| > -|x| (A) \text{ pt. } (\forall) x \in \mathbb{R}^* \end{array} \right.$$

$$4) \text{ Situation ca : } |x|=7 \Rightarrow x=7 \text{ ou } x=-7$$

$$3\sqrt{5}-2\sqrt{3} = \sqrt{45} - \sqrt{12}, 45 > 12 \Rightarrow 3\sqrt{5} > 2\sqrt{3} \Rightarrow \\ \Rightarrow 3\sqrt{5}-2\sqrt{3} > 0$$

$$\Rightarrow |x| = 3\sqrt{5}-2\sqrt{3} \Leftrightarrow x = 3\sqrt{5}-2\sqrt{3} \text{ ou } \\ x = -(3\sqrt{5}-2\sqrt{3}) = 2\sqrt{3}-3\sqrt{5}$$

$$5) |x| = 3\sqrt{2}-2\sqrt{6}$$

$$3\sqrt{2}-2\sqrt{6} = \sqrt{18} - \sqrt{24} : 18 < 24 \Rightarrow \sqrt{18} < \sqrt{24} \Rightarrow$$

$$3\sqrt{2} < 2\sqrt{6} \Rightarrow 3\sqrt{2}-2\sqrt{6} < 0 \quad \left. \begin{array}{l} |x| \geq 0, (\forall) x \in \mathbb{R} \\ |x| = -3 \text{ (impossible)} \end{array} \right\}$$

$$|x| = 3\sqrt{2}-2\sqrt{6} \Rightarrow x \in \emptyset$$

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