

Liceul Tehnologic Economic de Turism Iași

**Concursul Județean de Științe aplicate
pentru clasele VIII-X**

Ediția a XIII -a

5 aprilie 2025

Clasa a VIII-a

Barem de corectare

Subiectul I

Itemul	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
Răspunsul corect	c	a	a	b	d	c	c	b	d	b
punctaj	5	5	5	5	5	5	5	5	5	5

Rezolvări:

Problema 1 .

a) $\begin{cases} x - 3 = 0 \\ 3 - |x + 2| \in \mathbf{R} \end{cases} \text{ sau } \begin{cases} x - 3 \neq 0 \\ 3 - |x + 2| \geq 0 \end{cases} \Leftrightarrow \dots\dots\dots (2p)$

$\Leftrightarrow x = 3 \text{ sau } |x + 2| \leq 3 \dots\dots\dots (2p)$

Finalizare: $x \in [-5, 1] \cup \{3\} \dots\dots\dots (1p)$

b) $\Leftrightarrow x \cdot \frac{1}{x} + x \cdot \frac{1}{y} + y \cdot \frac{1}{x} + y \cdot \frac{1}{y} \geq 4 \Leftrightarrow \frac{x}{y} + \frac{y}{x} \geq 2 \Leftrightarrow \dots\dots\dots (2p)$

$\Leftrightarrow \frac{x^2+y^2}{xy} \geq 2 \Leftrightarrow x^2 + y^2 - 2xy \geq 0 \dots\dots\dots (2p)$

Finalizează: $\Leftrightarrow (x - y)^2 \geq 0 \dots\dots\dots (1p)$

c) $E(x) = \frac{x+5+2x-2}{x-1} \cdot \frac{x^2-x+5x-5}{x^2+x+2x+2} - \frac{x+7}{x+2} = \frac{3x+3}{x-1} \cdot \frac{x(x-1)+5(x-1)}{x(x+1)+2(x+1)} - \frac{x+7}{x+2} = \dots\dots\dots (2p)$

$= \frac{3(x+1)}{x-1} \cdot \frac{(x-1)(x+5)}{(x+1)(x+2)} - \frac{x+7}{x+2} = \frac{3(x+5)}{x+2} - \frac{x+7}{x+2} = \frac{3x+15-x-7}{x+2} = \frac{2x+8}{x+2} \dots\dots\dots (2p)$

și finalizare: $(x + 2) \cdot E(x) = 3x + 7 \Leftrightarrow (x + 2) \cdot \frac{2x+8}{x+2} = 3x + 7$

$\Leftrightarrow 2x + 8 = 3x + 7 \Leftrightarrow x = 1 \dots\dots\dots (1p)$

d) Pentru $x = 5$ avem $f(5 - 2) = 2 \cdot 5 - 4 - f(3) \Leftrightarrow 2f(x) = 6 \Leftrightarrow f(3) = 3 \dots\dots\dots (2p)$

de unde $f(x - 2) = 2(x - 2) - 3$ deci $f(x) = 2x - 3 \dots\dots\dots (2p)$

$\frac{f(a)+f(b)}{2} = \frac{(2a-3)+(2b-3)}{2} = \frac{2a+2b-6}{2} = 2 \cdot \frac{a+b}{2} - 3 = f\left(\frac{a+b}{2}\right) \dots\dots\dots (1p)$

