



## CONCURSUL DE MATEMATICĂ "DAN BARBILIAN"

București 2023 -2024

### Barem cls a XI-a

Oficiu: 10p

I. 50p

1	2	3	4	5	6	7	8	9	10
b	a	b	a	d	a	d	a	b	c
5p	5p	5p	5p	5p	5p	5p	5p	5p	5p

II. 40p

<b>1a</b>	$A_{\Delta ABC} = \frac{1}{2} \begin{vmatrix} -5 & 2 & 1 \\ -1 & -1 & 1 \\ 3 & 4 & 1 \end{vmatrix} =$	3p
	$= \frac{1}{2}  (-5) \cdot (-1) \cdot 1 + 2 \cdot 1 \cdot 3 + (-1) \cdot 4 \cdot 1 - 1 \cdot (-1) \cdot 3 - 1 \cdot 4 \cdot (-5) - 2 \cdot (-1) \cdot 1  =$ $= \frac{1}{2}  5 + 6 - 4 + 3 + 20 + 2  =$	4p
	$= \frac{1}{2}  32  = \frac{32}{2} = 16$	3p
<b>1b</b>	$\begin{vmatrix} a & a & 1 \\ 3 & 4 & 1 \\ x & 4 & 1 \end{vmatrix} = 0$	2p
	$a \cdot 4 \cdot 1 + x \cdot a \cdot 1 + 3 \cdot 4 \cdot 1 - x \cdot 4 \cdot 1 - a \cdot 4 \cdot 1 - 3 \cdot a \cdot 1 = 0$	3p
	$4a + xa + 12 - 4x - 4a - 3a = 0$	2p
	$xa - 3a = 4x - 12$	1p
	$a(x - 3) = 4(x - 3)$	1p
	$a = 4$	1p
<b>2a</b>	$\lim_{x \rightarrow 3} \left[ (x^2 - 9) \left( \frac{1}{x - 3} \right) \right]$	3p



	$= \lim_{x \rightarrow 3} \frac{(x-3)(x+3)}{x-3} =$	<b>4p</b>
	$= \lim_{x \rightarrow 3} (x+3) = 3+3 = 6$	<b>3p</b>
<b>2b</b>	$m = \lim_{x \rightarrow +\infty} \left( x+1 + \frac{1}{x-3} \right) \cdot \frac{1}{x} =$	<b>3p</b>
	$m = \lim_{x \rightarrow +\infty} \left( \frac{x+1}{x} + \frac{1}{x(x-3)} \right) = 1$	<b>3p</b>
	$n = \lim_{x \rightarrow +\infty} \left( x+1 + \frac{1}{x-3} - x \right) = \lim_{x \rightarrow \infty} \left( 1 + \frac{1}{x-3} \right) = 1$	<b>3p</b>
	$y = x + 1$ ecuația asimptotei oblice spre $+\infty$	<b>1p</b>