



## CONCURSUL DE MATEMATICĂ "DAN BARBILIAN"

București 2022-2023

### Barem cls a XII-a Varianta 1

Oficiu 10p

I. 50p

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

II. 40p

<b>1a</b>	$x \circ y = 2(x-1)(y-1)+1$	3p
	$2(2^x - 1)(4^x - 1)+1=1$	3p
	$2^x - 1 = 0 \Rightarrow 2^x = 1 \Rightarrow x = 0$	2p
	$4^x - 1 = 0 \Rightarrow 4^x = 1 \Rightarrow x = 0$	2p
<b>1b</b>	$2[n(n+1) - n - (n+1) + 1] + 1 \leq 13$	2p
	$n^2 - n - 6 \leq 0$	4p
	$\Delta = 25; n_1 = -2; n_2 = 3.$	2p
	$n \in [-2; 3] \cap \mathbb{N}^* = \{1, 2, 3\}$	2p
<b>2a</b>	$F(x) = \int f(x) dx = \frac{x^{2024}}{2024} + \frac{x^2}{2} + 2x + C$	3p
	$F(0) = 1 \Rightarrow C = 1$	3p
	$F(x) = \frac{x^{2024}}{2024} + \frac{x^2}{2} + 2x + 1$	4p
<b>2b</b>	$\lim_{x \rightarrow \infty} \frac{\int_0^x f(t) dt}{x^{2024}} \stackrel{LH}{=} \lim_{x \rightarrow \infty} \frac{f(x)}{2024x^{2024}} =$	3p
	$\lim_{x \rightarrow \infty} \frac{\frac{x^{2024}}{2024} + \frac{x^2}{2} + 2x}{x^{2024}} =$	3p
	$\frac{1}{2024}$	4p