



MULTIPLE-CHOICE TEST
in MATHEMATICS

1. (10p) If x_1 and x_2 are the solutions of the equation $x^2 + mx + 2 = 0$, $m \in \mathbb{R}$, such that $(x_1 + x_2)^2 - 2x_1x_2 = 5$ then:
- $m = 0$
 - $|m| = 3$
 - $m \notin \mathbb{Z}$
 - $m \in \mathbb{R} \setminus \mathbb{Q}$
 - $m \in \{-1, 0, 1\}$
2. (5p) The x-coordinate of the extreme point of the function $f: \mathbb{R} \rightarrow \mathbb{R}$, $f(x) = (m - 1)x^2 - (m + 2)x + 1$ is 2. Then the value of parameter $m \in \mathbb{R} \setminus \{1\}$ satisfies:
- $m = 2$
 - $m < 0$
 - $m = 0$
 - $m \in (-1, 1)$
 - $m \notin \mathbb{Z}$
3. (5p) The solution set S of the equation $\log_2(x + 2) - \log_2(x - 5) = 3$ is:
- $S = \{-6, 6\}$
 - $S = \{6\}$
 - $S = \{0\}$
 - $S = \{2, 3\}$
 - $S = \{-2, 5\}$
4. (10p) Let a_1, a_2, a_3 be the first three terms of a geometric progression $(a_n)_{n \geq 1}$ such that $a_1 + a_2 = 8$ and $a_2 - a_1 = 4$. If $S = a_1 + a_2 + a_3$ then:
- $S = \frac{3}{2}$
 - $S = 0$
 - $S = 26$
 - $S = 10$
 - $S = 9$
5. (10p) If $A = \begin{pmatrix} m & n \\ p & q \end{pmatrix} \in M_2(\mathbb{R})$ satisfies $(A - {}^tA)^{2025} = A - {}^tA$ (where tA is the transpose of A), then:
- $n - p \in \{2, 3\}$
 - $n - p \in \{-1, 0, 1\}$
 - $n - p = 2025$
 - $n - p = 0.5$
 - $n - p \in \{-2, 2\}$
6. (10p) Consider the system

$$\begin{cases} 2ax + y + z = 0 \\ x + ay - z = -1, \text{ where } a \in \mathbb{R}. \\ x + 2ay + z = 1 \end{cases}$$

The system is compatible determined (that is, it has a unique solution) for:



- a. $a \in \mathbb{R} \setminus \{-\frac{2}{3}, \frac{1}{2}\}$
- b. $a = \frac{1}{2}$
- c. $a = -\frac{2}{3}$
- d. $a \in \{-\frac{2}{3}, \frac{1}{2}\}$
- e. $a \in \emptyset$

7. (10p) If $L = \lim_{n \rightarrow +\infty} \frac{2^{-3n} - 2^{-9n}}{2^{-n} - 2^{-3n}}$ then:

- a. $L = \ln 2$
- b. $L = e$
- c. $L = 0$
- d. $L = 1$
- e. $L = \ln e + 1$

8. (10p) Let $f: (0, +\infty) \rightarrow \mathbb{R}$ be defined by

$$f(x) = \frac{e^x}{x}.$$

Then its derivative $f'(x)$ is equal to:

- a. $\frac{e^x(x-1)}{x^2}$
- b. $\frac{e^x(x+1)}{x^2}$
- c. $\frac{e^x}{x^2}$
- d. $\frac{e^x(x-1)}{x}$
- e. $\frac{e^x(x+1)^2}{x^2}$

9. (10p) Let $a, b \in \mathbb{R}$. If $F: \mathbb{R} \rightarrow \mathbb{R}$, $F(x) = 3ae^{x^2} + bx^3$ is a primitive of the function $f: \mathbb{R} \rightarrow \mathbb{R}$, $f(x) = 6xe^{x^2} + x^2$ then the value of expression $S = 3a - \ln b$ is:

- a. 0
- b. $3 + \ln 3$
- c. $3 - \ln 3$
- d. $1 - 3\ln 3$
- e. $\ln 3 + 1$

10. (10p) If $I_n = \int_0^1 x^n e^{-x} dx$, $n \in \mathbb{N} \setminus \{0\}$, then for all $n \in \mathbb{N} \setminus \{0, 1\}$ the expression $S = I_n - nI_{n-1}$ is equal to:

- a. $\frac{1}{n}$
- b. $e - \frac{1}{n}$
- c. $-\frac{1}{e} + n$
- d. $-\frac{1}{e}$
- e. ne

Admitere – 17 iulie 2025

BAREM

Disciplina de concurs: **Matematică (Ro)**

Cod subiect: **MEa1**

Cod Grilă

1 2 3 4 5 6

Disciplină

- Matematică (în limba română)
- Matematică (în limba engleză)
- Limba Română + Economie

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