MULTIPLE-CHOICE TEST
in MATHEMATICS

1. (10p) Let $f:[0,3]\to \boldsymbol{R},\ f(x)=\begin{cases}2e^x\ , & x\in[0,1]\\ x+1\ , & x\in(1,3]\end{cases}$. Then $\int_{1/2}^{2} f(x)\,\mathrm{d}x$ is equal to:

a. $e+e^{1/2}+\frac{5}{2}$
b. $2(e-e^{1/2})+\frac{5}{2}$
c. $2(e+e^{1/2})+\frac{7}{2}$
d. $2(1+e^{1/2})+\frac{5}{4}$
e. $2(e+e^{1/2})+\frac{5}{2}$

2. (5p) The definite integral $\int_{-1}^{2}\left(\frac{7x-1}{x^2-x-6}\right)\mathrm{d}x$ is equal to:

a. $-ln4$
b. $7ln4$
c. $ln4$
d. $5ln4$
e. $ln4+ln3$

3. (10p) The abscisse x of the global maximum point of the function
$$f:\boldsymbol{R}\to\boldsymbol{R},\ f(x)=min\{-2x+2,\ \ x+2\}$$
is equal to:

a. -1
b. 0.5
c. 0
d. 1
e. 2

4. (10p) Let F be a primitive of the function
$$f:(-2,\infty)\to\boldsymbol{R},\ f(x)=\frac{2x^2}{x+2}$$
such that $F(-1)=5$. Then $F(0)$ is equal to:

a. $8ln2$
b. $4ln2$
c. $2ln2$
d. $ln2$
e. 0

5. (10p) Consider the system $\begin{cases}2x+y=1\\ 3x+4y=-1\\ 4x-2y=\alpha\\ -6x+3y=\beta\end{cases}$, where $\alpha,\beta\in\boldsymbol{R}$.

If the system is compatible determined (that is, it has a unique solution), then the sum $\alpha+\beta$ is equal to:

a. -2
b. 1
c. -3
d. 2
e. 0

6. (5p) If $L = \lim_{n\to+\infty} \frac{2^{-n}+2^{4n}}{4^{-2n}-4^{2n}}$, then L is equal to:
a. $+\infty$
b. 0
c. 1
d. -1
e. 2

7. (10p) Let $f: D \to \boldsymbol{R}, f(x) = C_{3-x}^{3}$ (with $C_n^k = \frac{n!}{k!(n-k)!}$) and D be the maximal domain of the function. Which of the following statements is true?
a. f is strictly increasing on D
b. f is strictly decreasing on D
c. f is not monotonic on D
d. $D = \boldsymbol{Z}$
e. $D = \boldsymbol{N}$

8. (10p) Let $f: \boldsymbol{R} \to \boldsymbol{R}, f(x) = \begin{cases} a3^x, & x \le 0 \\ \frac{5^x-1}{x}, & x > 0 \end{cases}$. The value of the parameter $a \in \boldsymbol{R}$ such that f is continuous at $x = 0$ is:
a. 2
b. 5
c. $ln5$
d. $ln2$
e. 0

9. (10p) If $f: \boldsymbol{R} \to \boldsymbol{R}, f(x) = \frac{4^x}{2+4^x}$ and $S = \sum_{k=1}^{2025} f\left(\frac{2026-k}{2026}\right)$, then:
a. $S = 1012$
b. $S = 1012.5$
c. $S = 2026$
d. $S = 4^{2026}$
e. $S = ln\,2026$

10. (10p) Let $M = \left\{m \in \boldsymbol{R} \,\middle|\, \frac{mx^2+2(m-3)x+m+12}{x^2+2mx+m} \ge 0 \text{ for all } x \in \boldsymbol{R}\right\}$. Then:
a. $M \subset \left(\frac{3}{4}, 2\right)$
b. $M \subset \left[\frac{1}{3}, 1\right)$
c. $M \subset \left[\frac{3}{4}, 1\right)$
d. $M \subset \left(\frac{1}{2}, 1\right]$
e. $M \subset \left(0, \frac{1}{2}\right]$

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in MATHEMATICS

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c. $S = 2026$
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3. (5p) If $L = \lim_{n\to+\infty} \frac{2^{-n}+2^{4n}}{4^{-2n}-4^{2n}}$, then L is equal to:

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c. 1
d. 2
e. 0

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a. $2(1+e^{1/2}) + \frac{5}{4}$
b. $e + e^{1/2} + \frac{5}{2}$
c. $2(e + e^{1/2}) + \frac{7}{2}$
d. $2(e + e^{1/2}) + \frac{5}{2}$
e. $2(e - e^{1/2}) + \frac{5}{2}$

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7. (10p) Consider the system $\begin{cases} 2x+y=1 \\ 3x+4y=-1 \\ 4x-2y=\alpha \\ -6x+3y=\beta \end{cases}$, where $\alpha,\beta \in \boldsymbol{R}$.

If the system is compatible determined (that is, it has a unique solution), then the sum $\alpha+\beta$ is equal to:

a. 1
b. -3
c. 0
d. 2
e. -2

8. (10p) The abscisse x of the global maximum point of the function

$$f:\boldsymbol{R}\to\boldsymbol{R},\ f(x)=min\{-2x+2,\ x+2\}$$

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9. (10p) Let $f:\boldsymbol{R}\to\boldsymbol{R}, f(x)=\begin{cases} a3^x, & x\le 0 \\ \frac{5^x-1}{x}, & x>0 \end{cases}$. The value of the parameter $a\in\boldsymbol{R}$ such that f is continuous at $x=0$ is:

a. 5
b. 2
c. $ln2$
d. 0
e. $ln5$

10. (10p) Let $f:D\to\boldsymbol{R}, f(x)=C_{3-x}^{3}$ (with $C_n^k=\frac{n!}{k!(n-k)!}$) and D be the maximal domain of the function. Which of the following statements is true?

a. f is strictly increasing on D
b. $D=\boldsymbol{Z}$
c. f is strictly decreasing on D
d. f is not monotonic on D
e. $D=\boldsymbol{N}$

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b. $2ln2$
c. $4ln2$
d. 0
e. $8ln2$

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$$f:\boldsymbol{R}\to\boldsymbol{R},\ f(x)=min\{-2x+2,\ x+2\}$$

is equal to:

a. -1
b. 0
c. 0.5
d. 2
e. 1

5. (5p) If $L=\lim\limits_{n\to+\infty}\frac{2^{-n}+2^{4n}}{4^{-2n}-4^{2n}}$, then L is equal to:

a. 1
b. 0
c. -1
d. 2
e. $+\infty$

6. (10p) Let $f:D\to\boldsymbol{R}, f(x)=C_{3-x}^{3}$ (with $C_n^k=\frac{n!}{k!(n-k)!}$) and D be the maximal domain of the function. Which of the following statements is true?

a. f is strictly decreasing on D

b. f is not monotonic on D
c. $D = \boldsymbol{Z}$
d. $D = \boldsymbol{N}$
e. f is strictly increasing on D

7. (10p) Consider the system $\begin{cases} 2x + y = 1 \\ 3x + 4y = -1 \\ 4x - 2y = \alpha \\ -6x + 3y = \beta \end{cases}$, where $\alpha, \beta \in \boldsymbol{R}$.

If the system is compatible determined (that is, it has a unique solution), then the sum $\alpha + \beta$ is equal to:
a. 1
b. -2
c. 2
d. -3
e. 0

8. (10p) Let $M = \left\{m \in \boldsymbol{R} \,\middle|\, \frac{mx^2+2(m-3)x+m+12}{x^2+2mx+m} \geq 0 \text{ for all } x \in \boldsymbol{R}\right\}$. Then:
a. $M \subset \left[\frac{1}{3}, 1\right)$
b. $M \subset \left(\frac{3}{4}, 2\right)$
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a. $e + e^{1/2} + \frac{5}{2}$
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c. $2(e - e^{1/2}) + \frac{5}{2}$
d. $2(e + e^{1/2}) + \frac{5}{2}$
e. $2(1 + e^{1/2}) + \frac{5}{4}$

10. (10p) Let $f: \boldsymbol{R} \to \boldsymbol{R}, f(x) = \begin{cases} a3^x, & x \leq 0 \\ \frac{5^x - 1}{x}, & x > 0 \end{cases}$. The value of the parameter $a \in \boldsymbol{R}$ such that f is continuous at $x = 0$ is:
a. $ln5$
b. 5
c. $ln2$
d. 0
e. 2

MULTIPLE-CHOICE TEST
in MATHEMATICS

1. (10p) Let $f: D \to \boldsymbol{R}, f(x) = C_{3-x}^{3}$ (with $C_n^k = \frac{n!}{k!(n-k)!}$) and D be the maximal domain of the function. Which of the following statements is true?

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b. f is strictly increasing on D
c. f is not monotonic on D
d. $D = \boldsymbol{N}$
e. f is strictly decreasing on D

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a. $M \subset \left[\frac{1}{3}, 1\right)$
b. $M \subset \left[\frac{3}{4}, 1\right)$
c. $M \subset \left(\frac{1}{2}, 1\right]$
d. $M \subset \left(0, \frac{1}{2}\right]$
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b. $2ln2$
c. $8ln2$
d. 0
e. $ln2$

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d. 2
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a. 1
b. $+\infty$
c. 0
d. 2
e. -1

7. (10p) Consider the system $\begin{cases} 2x+y=1 \\ 3x+4y=-1 \\ 4x-2y=\alpha \\ -6x+3y=\beta \end{cases}$, where $\alpha,\beta\in\mathbf{R}$.

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a. 1
b. -2
c. 2
d. -3
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8. (10p) If $f:\mathbf{R}\to\mathbf{R}, f(x)=\frac{4^x}{2+4^x}$ and $S=\sum_{k=1}^{2025} f\left(\frac{2026-k}{2026}\right)$, then:
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b. $S=2026$
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d. $S=\ln 2026$
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b. $7\ln4$
c. $\ln4$
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10. (10p) Let $f:\mathbf{R}\to\mathbf{R}, f(x)=\begin{cases} a3^x, & x\le 0 \\ \frac{5^x-1}{x}, & x>0 \end{cases}$. The value of the parameter $a\in\mathbf{R}$ such that f is continuous at $x=0$ is:
a. 2
b. $\ln5$
c. $\ln2$
d. 0
e. 5

MULTIPLE-CHOICE TEST
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If the system is compatible determined (that is, it has a unique solution), then the sum $\alpha+\beta$ is equal to:

a. -3
b. -2
c. 1
d. 0
e. 2

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BUCHAREST UNIVERSITY OF ECONOMIC STUDIES
FACULTY OF ECONOMIC CYBERNETICS, STATISTICS AND INFORMATICS Test code: ***MEnb6***
Admission: ***Undergraduate programme, July 2026***

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c. 1
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a. 5
b. 2
c. $ln2$
d. 0
e. $ln5$

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c. $S = 1012.5$
d. $S = ln\,2026$
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b. $e + e^{1/2} + \frac{5}{2}$
c. $2(e + e^{1/2}) + \frac{7}{2}$
d. $2(e + e^{1/2}) + \frac{5}{2}$
e. $2(e - e^{1/2}) + \frac{5}{2}$

10. (10p) Let $f: D \to \boldsymbol{R}, f(x) = C_{3-x}^{3}$ (with $C_n^k = \frac{n!}{k!(n-k)!}$) and D be the maximal domain of the function. Which of the following statements is true?

a. f is not monotonic on D
b. f is strictly increasing on D
c. $D = \boldsymbol{Z}$
d. f is strictly decreasing on D
e. $D = \boldsymbol{N}$