University of Belgrade
Faculty of Organizational Sciences

7 June 2026

MOCK MATHEMATICS ENTRANCE EXAM

The test contains 20 questions on 2 pages. Each question is worth 5 points. If you do not wish to choose one of the first five offered answers, you may mark "N", which is worth 0 points. For an incorrect answer, 0.5 points are deducted. If, for a given question, more than one answer is marked or no answer is marked, as well as if the answer is marked incorrectly in any way, 1 point is deducted.

Test code: **641270**

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1. If $i^2 = -1$, then the value of the expression $\left(\dfrac{4-3i}{3+4i}\right)^{2026}$ is equal to:

A) $1+2i$; B) -1; C) $2i-1$; D) $-i$; E) i; N) I don't know.

2. There are 40% straight-A students in a certain class. If the number of straight-A students increases by 3, their percentage becomes 50%. The number of students in that class is equal to:

A) 32; B) 30; C) 28; D) 33; E) 27; N) I don't know.

3. For $|a| \neq |b|$, the expression $\left(4\left(1-\dfrac{a-b}{a^2-ab+b^2} : \dfrac{a+b}{a^2+ab+b^2}\right)\cdot\left(a^3+b^3\right)\right)^{1/3}$ is identically equal to:

A) ab; B) $3a$; C) b; D) a; E) $2b$; N) I don't know.

4. The value of the expression $\log_{49}\sqrt{5}\cdot\log_5 16\cdot\dfrac{\ln 7}{\ln\sqrt{2}}$ is equal to:

A) 7; B) 25; C) 2; D) 5; E) $\dfrac{1}{2}$; N) I don't know.

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5. The value of the expression $\dfrac{(2+\sqrt{3})\sqrt{19-8\sqrt{3}}}{4-\sqrt{3}}-\sqrt{3}$ is equal to:

A) 1; B) $2\sqrt{3}$; C) 2; D) $2-\sqrt{3}$; E) $2+\sqrt{3}$; N) I don't know.

6. The sum of all solutions of the equation $\log_{2026}\left(2027-2026^{1+x}\right)+x=0$ is equal to:

A) 0; B) -1; C) 2; D) 1; E) -2; N) I don't know.

7. If $f\left(\dfrac{x}{5}+1\right)=x+4$, and f^{-1} is the inverse function of f, then:

A) $f^{-1}(x)=5x-1$; B) $f^{-1}(x)=\dfrac{x}{5}-\dfrac{1}{5}$; C) $f^{-1}(x)=\dfrac{x}{5}+1$; D) $f^{-1}(x)=1-\dfrac{x}{5}$; E) $f^{-1}(x)=\dfrac{x}{5}+\dfrac{1}{5}$; N) I don't know.

8. The number of negative integer solutions of the inequality $2^{x^3}\cdot 4^{x^2}\cdot 8^{x}\geq\dfrac{1}{4}$ is equal to:

A) 3; B) 4; C) 2; D) 1; E) 0; N) I don't know.

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9. The set of all solutions of the inequality $\dfrac{12x^2-5x+31}{x^2-1} \leq 2$ is:

A) $(-1,1)$; B) $(-1,1) \cup \left[\dfrac{3}{2},+\infty\right)$; C) $(1,+\infty)$; D) $\left[\dfrac{3}{2},+\infty\right)$; E) $(-1,+\infty)\setminus\{1\}$; N) I don't know.

10. The sum of all solutions of the equation $(x-2)\sqrt{x^2-2x+10} = 2x^2-3x-2$ is equal to:

A) 2; B) 3; C) -1; D) 1; E) -3; N) I don't know.

11. A debt of 5136 euros is being paid back in 48 monthly payments which form an arithmetic progression. If the first payment is equal to 60 euros, then the third one is equal to:

A) 120 euros; B) 128 euros; C) 124 euros; D) 66 euros; E) 64 euros; N) I don't know.

12. The value of the expression $\operatorname{tg}\dfrac{\pi}{12} + \operatorname{ctg}\dfrac{\pi}{12}$ is equal to:

A) $\sqrt{6}-\sqrt{2}$; B) 4; C) $4+2\sqrt{3}$; D) 2; E) $\sqrt{3}+1$; N) I don't know.

13. If $1-i$ is the root of the polynomial $P(x) = ax^4+bx^3+3x^2-4x-2$, then $2a+b$ is equal to:

A) 4; B) -3; C) -1; D) 1; E) 2; N) I don't know.

14. The number of all solutions of the equation $\cos 4x - 1 + 8\sin^2 x - 8\sin x = 0$ which are elements of the interval $[0, 2\pi]$ is equal to:

A) 3; B) 6; C) 7; D) 4; E) 8; N) I don't know.

15. The sum of all possible values of a real-valued parameter p such that the circle $(x-p)^2+(y+2)^2 = 25$ is tangent to the line $3x+4y-10=0$ is equal to:

A) 18; B) 17; C) 9; D) 16; E) 12; N) I don't know.

16. Let ABC be a triangle with side lengths of $|BC| = 11\,\text{cm}$, $|AC| = 9\,\text{cm}$, and $|AB| = 10\,\text{cm}$. The points D and E lie on side AB, such that CD is the height of the triangle, and CE is its median. The area of the circle circumscribed around the triangle CDE is equal to:

A) $18\pi\,\text{cm}^2$; B) $19\pi\,\text{cm}^2$; C) $\dfrac{69}{4}\pi\,\text{cm}^2$; D) $20\pi\,\text{cm}^2$; E) $23\pi\,\text{cm}^2$; N) I don't know.

17. A sphere with a surface area of $12\pi\,\text{cm}^2$ is inscribed in the frustum of a cone such that it touches both of its bases at their respective centers and touches the lateral surface along a circle. If the angle between the generatrix of the cone and its larger base measures $60°$, then the lateral area of the frustum is equal to:

A) $36\pi\,\text{cm}^2$; B) $25\pi\,\text{cm}^2$; C) $20\pi\,\text{cm}^2$; D) $24\sqrt{3}\pi\,\text{cm}^2$; E) $16\pi\,\text{cm}^2$; N) I don't know.

18. The maximal value of the function $f(x) = \dfrac{(x+3)(3-x)}{(x+3)^2+(3-x)^2}$ is equal to:

A) $\dfrac{1}{2}$; B) 1; C) -3; D) 3; E) $\dfrac{3}{2}$; N) I don't know.

19. On each side of a square, there are four distinct points that are not the vertices of the square. The number of distinct triangles that can be formed using these points is equal to:

A) 328; B) 544; C) 512; D) 556; E) 560; N) I don't know.

20. If $\left(\sqrt{n+20}\right)! = 120$, then the coefficient of the term containing $\dfrac{1}{x}$, $x \neq 0$, in the expansion of $\left(2x-\dfrac{1}{x}\right)^n$ is equal to:

A) -40; B) -30; C) -20; D) -60; E) -50; N) I don't know.