

A MOCK EXAM

Training exercises to prepare for 'Economics and Management' access test.

1. The set of solutions to $(x^2 - 4) < 0$ is given by
 - a. \emptyset
 - b. \mathbb{R}
 - c. $(-2, 2)$
 - d. $\mathbb{R} \setminus \{-2, 2\}$
2. The number $(5 \cdot \pi)$ is
 - a. Rational
 - b. Irrational
 - c. Natural
 - d. $5 \cdot 3, 1415$
3. If $\log_{10} x = 2$ then x is worth:
 - a. 10
 - b. 2
 - c. 1
 - d. 100
4. The lines described by $y = -\frac{1}{3}x + 5$ and $y = 3x - 1$:
 - a. Are parallel
 - b. Coincide
 - c. Have two distinct common points
 - d. Are perpendicular
5. The expression $\frac{ab + a}{b}$ where $b \neq 0$, is equal to:
 - a. $2a$
 - b. $\frac{a}{b}$
 - c. $a \frac{b+1}{b}$
 - d. $2a + 1$

6. Given $a > b > 0$; it holds :

- a. $\log(a - b) = \log a - \log b$
- b. $\log(a/b) = \log a - \log b$
- c. $\log(a - b) = \log a / \log b$
- d. $\log(a/b) = \log a / \log b$

7. If $xy = 3$ then $4x^2y^2$ is worth:

- a. 324
- b. 24
- c. 36
- d. 12

8. For all real a we have:

- a. $a^3 \cdot a^4 = a^{12}$
- b. $a^3 \cdot a^4 = (a^4)^3$
- c. $a^3 \cdot a^4 = a^7$
- d. $a^3 \cdot a^4 = a^{-1}$

9. The number of solutions to equation $|5 - x| = 3$ is:

- a. 4
- b. 1
- c. 2
- d. 0

10. Find S the set of solutions to the system

$$\begin{cases} 2x \geq -3 \\ x + 1 < 0 \end{cases}$$

- a. $S = \left[-\frac{3}{2}, 1\right)$
- b. $S = \emptyset$
- c. $S = \left(-\infty, -\frac{3}{2}\right] \cup (-1, +\infty)$
- d. $S = \left[-\frac{3}{2}, -1\right)$

11. What of following equations represents a line parallel to the x -axis?

- a. $y = -50$
- b. $x = -5$
- c. $x = y - 2$
- d. $y = x + 1$

12. Given the circle C described by $x^2 + y^2 = 5$, then $P = (3, -4)$:

- a. Is an exterior point of C
- b. Is an interior point of C
- c. Is exactly the center of C
- d. Belongs to C

13. Find the set of solutions of $e^{3x} \leq 8$.

- a. $x \leq \ln 3$
- b. $x \leq \ln 8$
- c. $x \leq \ln 2$
- d. $x \leq \frac{8}{3}$

14. Given the sets $A = \{x \in N \mid x \text{ is an even number}\}$,

$B = \{x \in N \mid x \text{ is an odd number}\}$ and $C = \{x \in N \mid x \text{ is a multiple of } 3\}$.

Say which one of the following sets is empty:

- a. $A \cup B$
- b. $A \cup C$
- c. $A \cap B$
- d. $A \cap C$

15. The parabola given by equation $y = x^2 + 2x + 1$ has vertex in the point

- a. $P_1 = (-1, 0)$
- b. $P_2 = (1, 0)$
- c. $P_3 = (0, 1)$
- d. $P_4 = (0, 0)$

16. Equation $(x^2 - 25)(x^2 + 4)(x - 1) = 0$ admits

- a. 2 real solutions
- b. 0 real solutions
- c. 5 real solutions
- d. 3 real solutions

17. The set of solutions of the inequality $x^2 \leq 0$ is

- a. \mathbb{R}
- b. \emptyset
- c. $x = 0$
- d. $x \neq 0$

18. Which of following equalities is TRUE for all $x \in \mathbb{R}$?

- a. $\sqrt{x^2} = |x|$
- b. $\sqrt{x^2} = x$
- c. $\sqrt{x^2} = -|x|$
- d. $\sqrt{x^2} = -x^{1/2}$

19. The number 0.00001 is equal to

- a. 10^{-4}
- b. 10^{-5}
- c. 10^{-6}
- d. 10^5

20. The distance between the two points $A = (-1,1)$ and $B = (-2,2)$ is

- a. $\sqrt{18}$
- b. 9
- c. $2\sqrt{3}$
- d. $\sqrt{2}$

21. Compute the area of the triangle with vertices $(1,0)$, $(2,0)$, and $(0,4)$

- a. 1
- b. 2
- c. 4
- d. 8

22. The set of solutions to $\left(\frac{1}{3}\right)^x \geq 9$ is given by:

- a. $x > -2$
- b. $x \leq -2$
- c. $x \geq -2$
- d. $x < -3$

23. The equation $y^2 = 10 - x^2$ represents:

- a. A circle
- b. A parabola
- c. A hyperbola
- d. It doesn't represent a real curve

24. What of the following expressions is equal to $4x^2 - 12x + 9$?

- a. $(2x - 3)(2x + 3)$
- b. $(2x + 3)^2$
- c. $(2x - 3)^2$
- d. $(2x)^2 - 9$

25. What of the following equations represents a line tangent to the curve $y = -3x^2$?

- a. $y = -3$
- b. $y = 0$
- c. $y = 3$
- d. $y = -1$

26. The set of solutions to $\sqrt[4]{(x^2 - 4)} < 0$ is:

- a. $\mathbb{R} \setminus \{-2, 2\}$
- b. $\{-2, 2\}$
- c. $\{x \in \mathbb{R} : -2 \leq x \leq 2\}$
- d. \emptyset

27. Solve the inequality $\frac{x}{x^2 + 1} > 0$

- a. $x \in \mathbb{R} : x > 0$
- b. $x \in \mathbb{R} : x > 1$
- c. $x \in \mathbb{R} : x > -1$
- d. $x \in \mathbb{R} : x < 1$

28. Given the propositions $P(x) =$ "x is less than 3" and $Q(x) =$ "x is less than 8", then:

- a. $P(x)$ is a sufficient and necessary condition for $Q(x)$?
- b. $P(x)$ is a necessary condition for $Q(x)$?
- c. $P(x)$ is a sufficient condition for $Q(x)$?
- d. All the previous answers are wrong

29. The slope of the line $24x - 4y + 5 = 0$ is:

- a. -6
- b. 5
- c. 6
- d. $\frac{1}{6}$

30. Equation $3^x = 0$:

- a. Has exactly two solutions
- b. Has exactly one solution
- c. Has infinite solutions
- d. Has no solutions

31. Say which one of the following sentences concerning the straight lines represented by equations $y = -3x + 2$ and $3y = x + 5$ is FALSE:

- a. They share one and only one point of the plane
- b. They have intersection in the point $(\frac{1}{10}, \frac{17}{10})$
- c. They are parallel
- d. They are perpendicular

Solutions:

1c- 2b - 3d - 4d - 5c - 6b - 7c - 8c - 9c - 10d - 11a - 12a - 13c - 14c - 15a - 16d - 17c - 18a - 19b - 20d - 21b - 22b - 23a - 24c - 25b - 26d - 27a - 28c - 29c - 30d - 31c