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Test:

Sample Test D [Taken from the Official Syllabus]

Source:

http://www.lf3.cuni.cz/3LFEN-13-version1-sylabus_mathematics.pdf

Question 1

Q: Find a simple form of

$$\sqrt{\frac{\sqrt[2]{a^3}}{\sqrt[3]{b^6 a^{-3}}}}$$

- A) $a^{-\frac{3}{4}} b^2$ B) $a^{\frac{5}{4}} b^{-1}$ C) $\frac{1}{b}$ D) $a^{\frac{5}{4}} b^2$

Question 2

Q: If $0 < \alpha < \pi$ and $\sin \alpha = 0.72$, what is $\sin(\pi - \alpha)$?

- A) $\cos \alpha$ B) -0.72 C) 0.18 D) 0.72

Question 3

Q: The function $y = x^2 + 2x + 1$ is:

- A) even B) odd C) increasing for large x D) decreasing for large x

Question 4

Q: What is the domain of a function $y = \log_{10} \left(\frac{1+2x}{2-x} \right)$?

- A) $(-2, 2)$ B) All reals C) $(0, 2) \cup (2, 4)$ D) $(-1/2, 2)$

Question 5

Q: What is the sum of first 10 terms of an arithmetical sequence if the twelfth term a_{12} is 14 and the sixteenth term $a_{16} = 22$?

- A) 10 B) 36 C) 110 D) 180

Question 6

Q: What is the solution of equation: $\log_2(x - 2) = 3$

- A) 5 B) 2 C) 10 D) no solution

Question 7

Q: What is the solution of inequality: $\frac{16}{|x+3|} > 2$

- A) $(-11, -3) \cup (-3, 5)$ B) $(-\infty, -11) \cup (5, \infty)$ C) $(-11, 5)$ D) no solution

Question 8

Q: There are 3 black and 3 white balls in the bowl. What is the probability that two randomly picked balls are not of the same color?

- A) $3/6$ B) $2/5$ C) $3/5$ D) $11/30$

Question 9

Q: The 8 digit binary code may include only digits 0 and 1, which can be repeated in the code. How many combinations are there?

- A) 16 B) 65 C) 8! D) 256

Question 10

Q: The surface area of the square M is $8a^2$. What is the area of the square N , which side is equal to the diagonal of the square M ?

- A) $16a^2$ B) $8\sqrt{3} a^2$ C) $8\sqrt{2} a^2$ D) $8a^2$

Question 11

Q: What is the volume of a cube if its surface area is 72?

- A) 72 B) $24\sqrt{3}$ C) $432\sqrt{2}$ D) 5184

Question 12

Q: What is the slope k of the line segment with end points $(3, 20)$, $(28, -22)$?

- A) 6.7 B) -2.8 C) -0.26 D) 0.06

Question 13

Q: A curve has equation $x^2 - 4x + 6y - 6 = 0$. What is this?

- A) circle B) ellipse C) parabola D) hyperbola

Question 14

Q: Find the parameter p so that the vectors $\mathbf{u} = (2, p)$ and $\mathbf{v} = (3 - p, 4)$ are perpendicular to each other.

- A) -3 B) 0 C) 2 D) 4

Answer Key:

1. B
2. D
3. C
4. D
5. A
6. C
7. A
8. C
9. D
10. A
11. B
12. B*
13. C
14. A