MATHS

BOOKS - NTA MOCK TESTS

JEE MOCK TEST 13

Mathematics

1. If the $2^{nd}, 5^{th}$ and 9^{th} terms of a non-constant arithmetic progression are in geometric progession, then the common ratio of this geometric progression is

A. 1

B. $\frac{7}{4}$

C. $\frac{8}{5}$

D. $\frac{4}{3}$

Answer: D

Watch Video Solution

2. All possible numbers are formed using the digits $1, 1, 2, 2, 2, 2, 3, 4, 4$ taken all at a time. The number of such numbers in which the odd digits occupy even places is:

A. 175

B. 162

C. 180

D. 160

Answer: C

Watch Video Solution

3. Let w denote the words in the english dictionary. Define the relation R by: R = $\{(x, y) \in W \times W \mid$ words x and y have at least one letter in common}. Then R is: (1) reflexive, symmetric and not transitive (2) reflexive, symmetric and transitive (3) reflexive, not symmetric and transitive (4) not reflexive, symmetric and transitive

A. reflexive , symmetric and not transitive

B. reflexive,symmetric and transitive

C. reflexive , not symmetric and transitive

D. not reflexive , symmetric and transitive

Answer: A

Watch Video Solution

4. The value of a for which $ax^2 + \sin^{-1}(x^2 - 2x + 2) + \cos^{-1}(x^2 - 2x + 2) = 1$ has a real solution is

A. $-\frac{2}{\pi}$

B. $\frac{2}{\pi}$

C. $-\frac{\pi}{2}$

D. $\frac{\pi}{2}$

Answer: C

Watch Video Solution

5. The general solution of the differential equation

$(2x - y + 1)dx + (2y - x + 1)dy = 0$ is -

A. $x^2 + y^2 + xy - x + y = c$

B. $x^2 + y^2 - xy + x + y = c$

C. $x^2 - y^2 + 2xy - x + y = c$

D. $x^2 - y^2 - 2xy + x - y = c$

Answer: B

Watch Video Solution

6. The mean of five numbers is 0 and their variance is 2 .If three of those numbers are -1,1 and 2, then the other two numbers are

A. -5 and 3

B. -4 and 2

C. -3 and 1

D. -2 and 0

Answer: D

Watch Video Solution

7. The first integral term in the expansion of $\left(\sqrt{3}+2^{\frac{1}{3}}\right)^{9}$, is

A. 2^{nd}term

B. 3^{rd} term

C. 4^{th} term

D. 5^{th} term

Answer: C

Watch Video Solution

8. If $\cos\alpha + \cos\beta = a, \sin\alpha + \sin\beta = b$ and $\alpha - \beta = 2\theta$, then $\frac{\cos 3\theta}{\cos\theta} =$

A. $a^2 + b^2 - 2$

B. $a^2 + b^2 - 3$

C. $3 - a^2 - 3$

D. $\frac{a^2 + b^2}{4}$

Answer: B

Watch Video Solution

9. If the image of the point (1,-2,3) in the plane $2x + 3y - z = 7$ is the point (α, β, γ), then the value of $\alpha + \beta + \gamma$ is equal to

A. -6

B. 10

C. 8

D. -4

Answer: A

Watch Video Solution

10. The value of $\int \frac{dx}{x(x^n+1)}$ is equal to

A. $\frac{1}{n}\log_e\left(\frac{x^n}{x^n+1}\right)+c$

B. $\frac{1}{n}\log_e\left(\frac{x^n+1}{x^n}\right)+c$

C. $\log_e\left(\frac{x^n}{x^n+1}\right)+c$

D. None of these

Answer: A

Watch Video Solution

11. If f is a function defined as $f(x)=x^2-x+5,\ f:\left(\frac{1}{2},\infty\right)\to\left(\frac{19}{4},\infty\right)$, and g(x) is its inverse function, then g'(7) is equal to

A. $-\frac{1}{13}$

B. $\frac{1}{13}$

C. $\frac{1}{3}$

D. $-\frac{1}{3}$

Answer: C

Watch Video Solution

12. Let α and β be two roots of the equation $x^2 + 2x + 2 = 0$. Then $\alpha^{15} + \beta^{15}$ is equal to

A. -512

B. 128

C. 512

D. -256

Answer: D

Watch Video Solution

13. The value of f (0), such that $f(x)=\frac{1}{x^2}(1-\cos(\sin x))$ can be made continuous at x=0 , is

A. $\frac{1}{2}$

B. 2

C. $\frac{1}{4}$

D. 4

Answer: A

Watch Video Solution

14. The locus of the centre of the circle which cuts the circle $x^2 + y^2 - 20x + 4 = 0$ orthogonally and touches the line $x = 2$ is

A. $y^2 = 16x + 4$

B. $x^2 = 16y$

C. $x^2 = 16y + 4$

D. $y^2 = 16x$

Answer: D

Watch Video Solution

15. The parabolas $y^2 = 4x$ and $x^2 = 4y$ divide the square region bounded by the lines x=4, y=4 and the coordinate axes. If S_1, S_2, S_3 are the areas of these parts numbered from top to bottom, respectively, then

A. $2 : 1 : 2$

B. $1:1:1$

C. $1:2:1$

D. $1:2:3$

Answer: B

Watch Video Solution

16. The value of

$$\lim_{x \to \infty} \frac{2x^{1/2} + 3x^{1/3} + 4x^{1/4} + \dots nx^{1/n}}{(2x-3)^{1/2} + (2x-3)^{1/3} + \dots + (2x-3)^{1/n}}$$

is

A. $\sqrt{2}$

B. 2

C. $\frac{1}{\sqrt{3}}$

D. 0

Answer: A

Watch Video Solution

17. If $f(x)=x^3+4x^2+ax+5$ is a monotonically decreasing function of x in the largest possible interval `(-2,-2//3), then the value of a is

A. $\lambda=4$

B. $\lambda=2$

C. $\lambda = -1$

D. λ has no real value

Answer: A

Watch Video Solution

18. If the angles of elevation of the top of tower from three collinear points A, B and C, on a line leading to the foot of the tower, are 30°, 45° and 60° respectively, then the ratio , $AB : BC$ is

A. $2 : 3$

B. $\sqrt{3} : 1$

C. $\sqrt{3} : \sqrt{2}$

D. $1 : \sqrt{3}$

Answer: B

Watch Video Solution

19. A unit vector in the xy-plane that makes an angle of $\frac{\pi}{4}$ with the vector $\hat{i} + \hat{j}$ and an angle of with the vector $3\hat{i} - 4\hat{j}$ is

A. $\frac{\hat{i} + \hat{j}}{\sqrt{2}}$

B. $\frac{\hat{i} - \hat{j}}{\sqrt{2}}$

C. $\frac{2\hat{i} - \hat{j}}{\sqrt{2}}$

D. None of these

Answer: D

Watch Video Solution

20. If $x = \frac{1-t^2}{1+t^2}$ and $y = \frac{2t}{1+t^2}$, then $\frac{dy}{dx}$ is equal to

A. $-\frac{y}{x}$

B. $\frac{y}{x}$

C. $-\frac{x}{y}$

D. $\frac{x}{y}$

Answer: C

Watch Video Solution

21. Let A be a matrix of order 3×3such that det (A)= 2 , $B = 2A^{-1}$ and $C = \frac{(adjA)}{\sqrt[3]{16}}$,then the value of $\det\left(A^3B^2C^3\right)$ is

Watch Video Solution

22. Given f(x) where

$$= \begin{cases} x|x| & \text{for} x \leq -1 \\ [x+1]+[1-x] & \text{for} -1 < x < 1, \\ -x|x| & \text{for} x \geq 1 \end{cases}$$ [.] denotes

the greatest integer function. If $I = \int_{-2}^{2} f(x) dx$,then

|3I| =

Watch Video Solution

23. The line $3x + 2y = 24$ meets the y-axis at A and the x-axis at B. The perpendicular bisector of AB meets the line through $(0, -1)$ parallel to the x-axis at C. If the area of triangle ABC is A , then the value of $\frac{A}{13}$ is________

Watch Video Solution

24. The minimum number of times a fair coin needs to be tossed, so that the probability of getting at least two heads is at least 0.96, is _____.

Watch Video Solution

25. Consider the equation $x^2 + 2x - n = 0$ where $n \in N$ and $n \in [5, 100]$. The total number of different values of n so that the given equation has integral roots is

Watch Video Solution