MATHS

BOOKS - NTA MOCK TESTS

JEE MOCK TEST 21

Mathematics

1. Let $P_1 : 2x + y + z + 1 = 0$

$P_2 : 2x - y + z + 3 = 0$ and

$P_3 : 2x + 3y + z + 5 = 0$ be three planes, then the

distance of the line of intersection of planes $P_1 = 0$ and $P_2 = 0$ from the plane $P_3 = 0$ is

A. $\frac{3}{\sqrt{14}}$ units

B. $\frac{6}{\sqrt{14}}$ units

C. $\frac{3}{\sqrt{7}}$ units

D. $\frac{6}{\sqrt{7}}$ units

Answer: B

Watch Video Solution

2. The parabolas $C_1 : y^2 = 4a(x - a)$ and $C_2 : y^2 = -4a(x - k)$ intersect at two distinct points A and B. If the slope of the tangent at A on C_1 is same as the slope of the normal at B on C_2, then the value of k is equal to

A. 3a

B. 2a

C. a

D. 0

Answer: A

Watch Video Solution

3. Let p, q and r be three statements, then $(p \to q) \to r$ is equivalent to

A. $(p \vee r) \wedge (q \vee r)$

B. $(p \vee r) \wedge (\sim q \vee r)$

C. $(p \wedge r) \vee (q \vee r)$

D. $(p \vee r) \to r$

Answer: B

Watch Video Solution

4. Let two sides of a rectangle of area 20 sq. units are along lines $x - y = 0$ and $x + y = 2$, then the locus of the point of intersection of diagonals is a

A. pair of ellipse

B. pair of straight lines

C. pair of hyperbola having eccentricity 2 and $\frac{2}{\sqrt{3}}$

D. pair of hyperbola each having eccentricity $\sqrt{2}$

Answer: D

Watch Video Solution

5. Let $2\vec{a} = \vec{b} \times \vec{c} + 2\vec{b}$ where $\vec{a}$, $\vec{b}$ and $\vec{c}$ are three unit vectors, then sum of all possible values of $\left|3\vec{a} + 4\vec{b} + 5\vec{c}\right|$ is

A. 10

B. 12

C. 14

D. 16

Answer: C

Watch Video Solution

6. If $f(1+x)=f(1-x)(\forall x \in R)$, then the value of the integral

$$I=\int_{-7}^{9} \frac{f(x)}{f(x)+f(2-x)} dx \text{ is}$$

A. 0

B. 2

C. 8

D. 10

Answer: C

Watch Video Solution

7. If $f(x)$ is a real valued function such that

$f(x+6) - f(x+3) + f(x) = 0, \forall x \in R,$ then

period of $f(x)$ is

A. 6

B. 12

C. 18

D. 24

Answer: C

Watch Video Solution

8. The value of $\lim_{x \to 0} \frac{\tan^2 3x}{\sqrt{5} - \sqrt{4 + \sec x}}$ is equal to

A. $2\sqrt{5}$

B. $-9\sqrt{5}$

C. $9\sqrt{5}$

D. $-36\sqrt{5}$

Answer: D

Watch Video Solution

9. If $-\pi < \theta < \pi$, the equation

$$(\cos 3\theta + 1)x^2 + 2(\cos 2\theta - 1)x$$

$$+(1 - 2\cos\theta) = 0$$

has more than two roots for

A. no value of θ

B. one value of θ

C. two value of θ

D. all value of θ

Answer: A

Watch Video Solution

10. If $In\left(2x^2-5\right), In\left(x^2-1\right)$ and $In\left(x^2-3\right)$ are the first three terms of an arithmetic progression, then its fourth term is

A. In 8 - In 3

B. In 3 - In 8

C. In 24

D. 2 In 6

Answer: A

Watch Video Solution

11. Image of line $\frac{x-2}{3}=\frac{y-1}{1}=\frac{z-1}{-4}$ in the plane $x+y+z=7$ is

A. $\frac{x-4}{1}=\frac{y-3}{1}=\frac{z-3}{1}$

B. $\frac{x-3}{1}=\frac{y-4}{1}=\frac{z-3}{1}$

C. $\frac{x-4}{3}=\frac{y-3}{1}=\frac{z-3}{-4}$

D. $\frac{x-3}{1}=\frac{y-4}{1}=\frac{z-3}{-4}$

Answer: C

Watch Video Solution

12. If $\pi < \theta < \frac{3\pi}{2}$ and $\cos\theta = -\frac{3}{5}$, then $\tan\left(\frac{\theta}{4}\right)$ is equal to

A. $\frac{\sqrt{5}-1}{2}$

B. $\frac{\sqrt{5}+1}{2}$

C. $\frac{-\sqrt{5}-1}{4}$

D. $\frac{-\sqrt{5}+1}{4}$

Answer: B

Watch Video Solution

13. If the value of integral

$$\int\left(x+\sqrt{x^2-1}\right)^2 dx = ax^3 - x + b\left(x^2-1\right)^{\frac{1}{b}}, + C$$

(where, C is the constant of integration), then

$a \times b$ is equal to

A. 1

B. $\frac{4}{9}$

C. 2

D. $\frac{9}{4}$

Answer: B

Watch Video Solution

14. The range of the function $\sin^{-1}\left(\frac{x^2}{1+x^2}\right)$ is

A. $[-\pi/2, \pi/2]$

B. $[0, \pi/2)$

C. $(0, \pi/2]$

D. $(-\pi/2, \pi/2)$

Answer: B

Watch Video Solution

15. The solution of the differential equation $\frac{1}{x^2}\left(\frac{dy}{dx}\right)^2 + 6 = \left(\frac{5}{x}\right)\frac{dy}{dx}$ is $y = \lambda x^2 + c$ (where, c is an arbitary constant). The sum of all the possible value of λ is

A. $\frac{3}{2}$

B. $\frac{5}{2}$

C. $\frac{2}{5}$

D. 2

Answer: B

Watch Video Solution

16. The number of tangents with positive slope that can be drawn from the origin to the curve $y = \sin x$ is

A. 0

B. 2

C. 4

D. infinitely many

Answer: D

Watch Video Solution

17. A complex number z is said to be unimodular if . Suppose z_1 and z_2 are complex numbers such that $\frac{z_1 - 2z_2}{2 - z_1 z_2}$ is unimodular and z_2 is not unimodular. Then the point z_1 lies on a : (1) straight line parallel to x-axis (2) straight line parallel to y-axis (3) circle of radius 2 (4) circle of radius $\sqrt{2}$

A. circle of radius $\sqrt{2}$

B. straight line parallel to x-axis

C. straight line parallel to y-axis

D. circle of radius 2

Answer: D

Watch Video Solution

Watch Video Solution

18. Equation of the straight line which meets the circle $x^2 + y^2 = 8$ at two points where these points are at a distance of 2 units from the point A(2, 2) is

A. $x + y = 2$

B. $x + y = 3$

C. $x + y = 1$

D. $x + y = 0$

Answer: B

Watch Video Solution

19. $If x_1, x_2, \ldots . x_n$ are n observations such that $\sum_{i=1}^{n} (x_i)^2 = 400$ and $\sum_{i=1}^{n} x_i = 100$ then possible values of n among the following is

A. 18

B. 20

C. 24

D. 27

Answer: D

Watch Video Solution

20. If the system of equation $x - 2y + 5z = 3$

$2x - y + z = 1$ and $11x - 7y + pz = q$ has infinitely many solution, then

A. $p + q = 2$

B. $p + q = 10$

C. $p - q = 2$

D. $p - q = 5$

Answer: C

Watch Video Solution

21. A term of randomly chosen from the expansion of $\left(\sqrt[6]{4}+\frac{1}{\sqrt[4]{5}}\right)^{20}$. If the probability that it is a rational term is P, then 420P is euqal to

Watch Video Solution

22. If a tangent of slope 2 of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{1}=1$ passes through the point $(-2,0)$, then the value of a^2 is equal to

Watch Video Solution

23. The number obtained after dividing the number formed by the last three digits of 17^{256} by 100 is

Watch Video Solution

24. The area (in sq. units) bounded by $y = 2 - |x - 2|$ and the x-axis is

Watch Video Solution

25. Let $y = x^3 - 6x^2 + 9x + 1$ be an equation of a curve, then the x-intercept of the tangent to this

curve whose slope is least, is

Watch Video Solution