MATHS

BOOKS - NTA MOCK TESTS

NTA JEE MOCK TEST 69

Mathematics

1. Let $P_1 : x + y + 2z = 3$ and $P_2 : x - 2y + z4$ be two planes. Let $A(2, 45)$ and $B(4, 3, 8)$ be two points in space. The equation of plane P_3 through the line of intersection of P_1 and P_2 such that the length of the projection upon it of the line segment AB is the least, is

A. $2x - y + 3z = 7$

B. $3y + z + 1 = 0$

C. $x + 3y + z + 2 = 0$

D. $3x - 3y + 4z - 11 = 0$

Answer: A

Watch Video Solution

2. If $A = \begin{bmatrix} 1 & 1 & 3 \\ 5 & 2 & 6 \\ -2 & -1 & -3 \end{bmatrix}$, where $A^x = O$ (where, O is a null matrix and $x < 15, x \in N$) then which of the following is true?

A. Greatest value of x is 13

B. Sum of the values of x is 102

C. Difference between the largest and the smallest value of x is 10

D. Number of values of x is 7

Answer: B

Watch Video Solution

3. The area (in sq. units) bounded by $y = \max\left(\sin^2 x, \sin^4 x\right), x \in \left[0, \frac{\pi}{2}\right]$ with the x - axis, from $x = 0$ to $x = \frac{\pi}{2}$ is

A. π

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

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

D. $\frac{\pi}{6}$

Answer: C

Watch Video Solution

4. A box contains 1 black and 1 white ball. A ball is drawn randomly and replaced in the box with an additional ball of the same colour, then a second ball is drawn randomly from the box containing 3 balls. The probability that the first drawn ball was white given that at least one of the two balls drawn was white is

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

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

C. $\frac{4}{5}$

D. $\frac{5}{11}$

Answer: B

Watch Video Solution

5. The number of real solution of $\cot^{-1}\sqrt{x(x+3)} + \sin^{-1}\sqrt{x^2+3x+1} = \frac{\pi}{2}$ is /are

A. 0

B. 1

C. 2

D. infinite

Answer: A

Watch Video Solution

6. Suppose the family of lines $ax + by + c = 0$ (where a, b, c are in artihmetic progression) be normal to a family of circles. The radius of the circle of the family which intersects the circle $x^2 + y^2 - 4x - 4y - 1 = 0$ orthogonally is

A. $2\sqrt{2}$ units

B. 2 units

C. $3\sqrt{2}$ units

D. 4 units

Answer: A

Watch Video Solution

7. If the function $f(x) = \frac{\sin 3x + a \sin 2x + b}{x^3}, x \neq 0$ is continuous at $x = 0$ and $f(0) = K, \forall K \in R,$ then $b - a$ is equal to

A. 4

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

C. 5

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

Answer: D

Watch Video Solution

8. If x = 6 and $y = -2$ then $x - 2y = 9$. The contrapositive of this statement is

A. If $x - 2y \neq 9$ then $x \neq 6$ or $y \neq -2$

B. If $x - 2y \neq 9$ then $x \neq 6$ and $y \neq -2$

C. If $x - 2y = 9$ then $x = 6$ and $y = -2$

D. None of these

Answer: A

Watch Video Solution

9. The point on the ellipse $16x^2 + 9y^2 = 400$, where the ordinate decreases at the same rate at which the abscissa increases is (a, b), then $a + 3b$ can be

A. 16

B. 19

C. 6

D. 9

Answer: B

Watch Video Solution

10. The integral $I = \int_{e}^{e+1} \frac{1+x^2}{1+x^3} dx$ satisfies

A. $I > 2$

B. $I > e$

C. $I < 0$

D. $I < 1$

Answer: D

Watch Video Solution

11. The following system of equations $5x - 7y + 3z = 3, 5x + y + 3z = 7$ and $5x + 3y + 2z = 5$ is

A. Consistent with trivial solution

B. Consistent with a unique non trivial solution

C. Consistent with infinite solutions

D. Inconsistent with no solution

Answer: B

Watch Video Solution

12. The order of the differential equation of the family of curves $y = \frac{a}{c}\sin(bx) + 3^{dx}$ where a, b, c, d are arbitrary constants is

A. 4

B. 3

C. 2

D. 1

Answer: B

Watch Video Solution

13. The sum of the rational terms in the expansion of $\left(\sqrt{2}+\sqrt[5]{3}\right)^{10}$ is

A. 31

B. 41

C. 51

D. 61

Answer: B

Watch Video Solution

14. A committee of 12 members is to be formed from 9 women and 8 men. The number of ways of forming the committee with women in majority is

A. 1008

B. 2702

C. 6062

D. 2352

Answer: B

Watch Video Solution

15. If both the roots of the equation $4x^2 - 2x + m = 0$ lie in the interval $(-1, 1)$, then

A. $-3 < m < -2$

B. $0 < m < 2$

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

D. $-2 < m \leq \frac{1}{4}$

Answer: D

Watch Video Solution

16. The number of solutions in the interval $[0, \pi]$ of the equation $\sin^3 x \cos 3x + \sin 3x \cos^3 x = 0$ is equal to

A. 7

B. 6

C. 5

D. 4

Answer: C

Watch Video Solution

17. Let $A(2, 0)$ and $B(-2, 0)$ are two fixed vertices of ΔABC. If the vertex C moves in the first quadrant in such a way that $\cot A + \cot B = 2$, then the locus of the point C is

A. $y = 2$

B. $x = 4$

C. $x = 2$

D. $y = 1$

Answer: A

Watch Video Solution

18. For two data sets, each with size 5, the variances are given to be 3 and 4 and the corresponding means are given 2 and 4, respectively. The variance of the combined data set is

A. $\frac{11}{2}$

B. $\frac{9}{2}$

C. $\frac{13}{2}$

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

Answer: B

Watch Video Solution

19. If a tangent having slope 2 of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is normal to the circle $x^2 + y^2 + bx + 1 = 0$, then the vlaue of $4a^2 + b^2$ is equal to

A. 4

B. 2

C. 16

D. 8

Answer: C

Watch Video Solution

20. If $\alpha, \beta \in C$ are the distinct roots of the equation $x^2 - x + 1 = 0$, then $\alpha^{101} + \beta^{107}$ is equal to

A. 2

B. -1

C. 0

D. 1

Answer: D

Watch Video Solution

21. The volume of a tetrahedron determined by the vectors $\vec{a}$, $\vec{b}$, $\vec{c}$ is $\frac{3}{4}$ cubic units. The volume (in cubic

units) of a tetrahedron determined by the vectors $3\left(\vec{a}\times\vec{b}\right), 4\left(\vec{b}\times c\right)$ and $5\left(\vec{c}\times\vec{a}\right)$ will be

Watch Video Solution

22. The value of $\lim_{x\to 0}\left(\frac{(1-\cos 4x)(5+\cos x)}{x\tan 5x}\right)$ is equal to

Watch Video Solution

23. If $I=\int\frac{1+x^4}{(1-x^4)^{\frac{3}{2}}}dx=\frac{1}{\sqrt{f(x)}}+C$(where, C is the constant of integration) and $f(2)=\frac{-15}{4}$, then the value of $2f\left(\frac{1}{\sqrt{2}}\right)$ is

Watch Video Solution

Watch Video Solution

24. If x,y are positive real numbers and $3x + 4y = 5$, then the lagest possible value of $16x^2y^3$ is

Watch Video Solution

25. Let the radius of the circle touching the parabola $y^2 = x$ at (1, 1) and having the directrix of $y^2 = x$ at $(1, 1)$ and having the directrix of $y^2 = x$ as its normal is equal to $k\sqrt{5}$ units, then k is equal to

Watch Video Solution