



MATHS

BOOKS - NTA MOCK TESTS

NTA JEE MOCK TEST 92

Mathematics

1. The value of a , such that the volume of the parallelepiped formed by the vectors $\hat{i} + \hat{j} + \hat{k}$, $\hat{j} + a\hat{k}$ and $a\hat{i} + \hat{k}$ becomes minimum, is

A. 3

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

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

D. -2

Answer: C



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2. *A and B* toss a fair coin each simultaneously 50 times.

The probability that both of them will not get tail at the

same toss is $(3/4)^{50}$ b. $(2/7)^{50}$ c. $(1/8)^{50}$ d. $(7/8)^{50}$

A. $\left(\frac{3}{4}\right)^{10}$

B. $\left(\frac{2}{7}\right)^{10}$

C. $\left(\frac{1}{4}\right)^{10}$

D. $\left(\frac{1}{2}\right)^{10}$

Answer: A



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3. A plane $P = 0$ passes through the line of intersection of the planes $x + y + z + 3 = 0$ and $x - y + z - 2 = 0$.

If the plane P divides the ratio $2:1$ internally and the equation of the plane is $ax - 2y + bz = c$ where $a, b, c \in N$, then the value of $3a + 4b - 5c$ is equal to

A. 22

B. 32

C. 42

D. 10

Answer: B



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4. Let A and B are two non-singular matrices of order 3 such that $A + B = 2I$ and $A^{-1} + B^{-1} = 3I$, then AB is equal to (where, I is the identity matrix of order 3)

A. A

B. B

C. $\frac{2I}{3}$

D. 21

Answer: C



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5. Let $f(b)$ be the minimum value of the expression $y = x^2 - 2x + (b^3 - 3b^2 + 4) \forall x \in R$. Then, the maximum value of $f(b)$ as b varies from 0 to 4 is

A. 20

B. 19

C. 63

D. 64

Answer: B



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6. Consider the integral $A = \int_0^1 \frac{e^x - 1}{x} dx$ and $B = \int_0^1 \frac{x}{e^2 - 1} dx$. Then, which of the following is incorrect?

A. $B < 1$

B. $A > 1$

C. $B > A$

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

Answer: C



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7. If $a, b \in R$ satisfy the equation $a^2 + 4b^2 - 4 = 0$, then the minimum value of $(2a + 3b)$ will be

A. -4

B. -5

C. -6

D. -10

Answer: B



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8. The equation of the curve satisfying the differential equation $x^2 dy = (2 - y) dx$ and passing through $P(1, 4)$ is

A. $y = x^2 + 3$

B. $y = 2 + 2e^{\frac{1}{x} - 1}$

C. $y = \sin(x - 1) + 4$

D. $y = 2e^{x-1} + 2$

Answer: B

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9. The domain of $f(x) = \frac{x}{16 - x^2} + \log_2(x^3 - 2x)$ is

A. $(-\sqrt{2}, 0) \cup (\sqrt{2}, \infty)$

B. $(-\sqrt{2}, 0) \cup (\sqrt{2}, 4)$

C. $(-\sqrt{2}, 0) \cup (4, \infty)$

D. $(-\sqrt{2}, 0) \cup (\sqrt{2}, 4) \cup (4, \infty)$

Answer: D



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10. Let p, q and r be three statements, then

$(\sim p \rightarrow q) \rightarrow r$ is equivalent to

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

B. $(p \rightarrow r) \wedge (q \rightarrow r)$

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

D. $(p \rightarrow q) \rightarrow r$

Answer: B



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11. The value of $\lim_{x \rightarrow \frac{\pi}{2}} \frac{\left[\frac{x}{3} \right]}{\ln(1 + \cot x)}$ is equal to (where,

$[\cdot]$ denotes the greatest integer function)

A. does not exist

B. is equal to 1

C. is equal to 0

D. is equal to -1

Answer: C



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12. A data consists of n observations : x_1, x_2, \dots, x_n .

If $\sum_{i=1}^n (x_i + 1)^2 = 11n$ and $\sum_{i=1}^n (x_i - 1)^2 = 7n$, then

the variance of this data is

A. 5

B. 8

C. 6

D. 7

Answer: D





13. Which of the following is a correct statement ?

A. Continuity at $x = a$ is sufficient for differentiability

at $x = a$

B. Differentiability at $x = a$ is sufficient for continuity

at $x = a$

C. Existence of limit at $x = a$ is sufficient for continuity

at $x = a$

D. Differentiability at $x = a$ is necessary for existence

of tangent at $x = a$

Answer: B



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14. The term independent of x in the expansion of

$$\left(x - \frac{1}{x}\right)^4 \left(x + \frac{1}{x}\right)^3 \text{ is:}$$

A. -3

B. 0

C. 1

D. 3

Answer: B



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15. The number of ways in which four different toys and five indistinguishable marbles can be distributed between 3 boys, if each boy receives at least one toy and at least one marble, is

- A. 42
- B. 100
- C. 150
- D. 216

Answer: D



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16. If p^{th} , $2p^{\text{th}}$ and $4p^{\text{th}}$ terms of an arithmetic progression are in geometric progression, then the common ratio of the geometric progression is

A. 1

B. 2

C. 3

D. 4

Answer: B



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17. The position vectors of vertices of $\triangle ABC$ are $(1, -2)$, $(-7, 6)$ and $\left(\frac{11}{5}, \frac{2}{5}\right)$ respectively. The measure of the interior angle A of the $\triangle ABC$, is,

A. $(75^\circ, 90^\circ)$

B. $(60^\circ, 75^\circ)$

C. $(45^\circ, 60^\circ)$

D. $(120^\circ, 150^\circ)$

Answer: B



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18. The two circles $x^2 + y^2 = ax$ and $x^2 + y^2 = c^2$ ($c > 0$) touch each other, if $\left| \frac{c}{a} \right|$ is equal to

A. 2

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

C. 1

D. None of these

Answer: C



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19. The area (in sq. units) bounded by the curve $y = |x - \pi| + |x - e|$, the ordinates at its points of non-differentiability and the x-axis is

A. $\pi + 2e$

B. $2\pi + e$

C. $(\pi - e)^2$

D. $\pi^2 - e^2$

Answer: C



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20. If z and w are complex numbers satisfying $\bar{z} + i\bar{w} = 0$ and $\text{amp}(zw) = \pi$, then $\text{amp}(w)$ is equal to (where, $\text{amp}(w) \in (-\pi, \pi]$)

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

B. $\frac{-\pi}{4}$

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

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

Answer: A



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21.

If

$$\begin{vmatrix} 2+x & x & x^2 \\ x & 2+x & x^2 \\ x^2 & x & 2+x \end{vmatrix} = \frac{1}{6}(x-a)(x-b)(x-c)(x-d)$$

an identity in x where a, b, c, d are independent of x , then

the value of $\frac{13}{25}abcd$ is



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22.

If

$$I = \int \frac{x^3 - 1}{x^5 + x^4 + x + 1} dx = \frac{1}{4} \ln(f(x)) - \ln(g(x)) + c$$

(where, c is the constant of integration) and

$f(0) = g(0) = 1$, then the value of $f(1) \cdot g(1)$ is equal to



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23. If $f: R \rightarrow \left[\frac{\pi}{3}, \pi \right)$ defined by $f(x) = \cos^{-1} \left(\frac{\lambda - x^2}{x^2 + 3} \right)$ is a surjective function, then λ is equal to

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24. The number of solutions of the equation $\tan x + \sec x = 2 \cos x$ lying in the interval $[0, 5\pi]$ is

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25. Tangents are drawn from any point on the directrix of $y^2 = 16x$ to the parabola. If the locus of the midpoint of

chords of contact is a parabola, then its length (in units) of the latus rectum is



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