



MATHS

BOOKS - NTA MOCK TESTS

NTA JEE MOCK TEST 46

Mathematics

1. If $-3 < \frac{x^2 - \lambda x - 2}{x^2 + x + 1} < 2$ for all $x \in R$,

then the value of λ belongs to

A. $(-1, 7)$

B. $(-6, 2)$

C. $(-1, 2)$

D. $(-6, 7)$

Answer: C



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2. Three numbers a , b and c are in geometric progression. If $4a$, $5b$ and $4c$ are in arithmetic

progression and $a + b + c = 70$, then the value of $|c - a|$ is equal to

A. 10

B. 20

C. 30

D. 40

Answer: C



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3. The exponent of 7 in $100C_{50}$ is

A. 0

B. 1

C. 2

D. 3

Answer: A



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4. If α and β are the solutions of $\sin x = -\frac{1}{2}$ in $[0, 2\pi]$ and α and γ are the solutions of $\cos x = -\frac{\sqrt{3}}{2}$ in $[0, 2\pi]$, then the value of $\frac{\alpha + \beta}{|\beta - \gamma|}$ is equal to

A. 1

B. 2

C. 3

D. 4

Answer: C



5. The value of the integral

$$I = \int_0^{\pi} [|\sin x| + |\cos x|] dx, \quad (\text{where } [.]$$

denotes the greatest integer function) is equal to

A. 1

B. 2

C. π

D. 2π

Answer: C



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6. The value of $\lim_{x \rightarrow 0} \frac{(\sec x + \tan x)^1}{x}$ is equal

to

A. e

B. e^2

C. e^{-1}

D. 1

Answer: A



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7. The minimum value of the function

$$f(x) = \frac{\tan x}{3 + 2 \tan x}, \quad \forall x \in \left[0, \frac{\pi}{2}\right) \text{ is}$$

A. 0

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

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

D. $\frac{1}{6}$

Answer: A



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8. The solution of the differential equation

$$y(\sin^2 x) dy + (\sin x \cos x) y^2 dx = x dx \quad \text{is}$$

(where C is the constant of integration)

A. $\sin^2 x \cdot y = x^2 + C$

B. $\sin^2 x \cdot y^2 = x^2 + C$

C. $\sin x \cdot y^2 = x^2 + C$

D. $\sin^2 x \cdot y^2 = x + C$

Answer: B



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9. The negation of $(\sim p \wedge q) \vee (p \wedge \sim q)$ is

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

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

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

D. both SO_4^{2-} and NO_3^-

Answer: B



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10. If $f(x) = \begin{cases} \frac{e^{|x|+|x|-1}}{|x|+|x|} & : x \neq 0 \\ -1 & : x = 0 \end{cases}$ (where

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

A. $f(x)$ is continuous at $x = 0$

B. $\lim_{x \rightarrow 0^+} f(x) = -1$

C. $\lim_{x \rightarrow 0^-} f(x) = 1$

D. $\lim_{x \rightarrow 0^+} f(x) = 1$

Answer: D



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11. If $\int \frac{dx}{x^2 + x} = \ln|f(x)| + C$ (where C is the constant of integration), then the range of $y = f(x)$, $\forall x \in R - \{-1, 0\}$ is

A. $R - \{1\}$

B. $R - \{0\}$

C. $R - \{0, 1\}$

D. $R - \{0, -1\}$

Answer: C



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12. Let $\vec{a} = 2\hat{i} + 3\hat{j} + 4\hat{k}$, $\vec{b} = \hat{i} - 2\hat{j} + \hat{k}$
and $\vec{c} = \hat{i} + \hat{j} - \hat{k}$. If $\vec{r} \times \vec{a} = \vec{b}$ and
 $\vec{r} \cdot \vec{c} = 3$, then the value of $|\vec{r}|$ is equal to

A. $\sqrt{155}$

B. $\sqrt{17}$

C. $2\sqrt{17}$

D. 3

Answer: A



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13. The chords passing through $(2, 1)$ intersect the hyperbola $\frac{x^2}{16} - \frac{y^2}{9} = 1$ at A and B. The locus of the point of intersection of tangents at A and B on the hyperbola is

A. $x - y = 1$

B. $x + y = 3$

C. $9x - 8y = 72$

$$D. 9x + 8y = 7$$

Answer: C



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14. If $\begin{vmatrix} \cos \theta & -1 & 1 \\ \cos 2\theta & 4 & 3 \\ 2 & 7 & 7 \end{vmatrix} = 0$, then the number

of values of θ in $[0, 1\pi]$ is

A. 1

B. 2

C. 3

D. 4

Answer: B



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15. A box contains x red balls and 10 black balls. 3 balls are drawn one by one without replacement. If the probability of choosing 3 red balls is equal to the probability of

choosing 2 red and 1 black ball, then the possible value of x can be

A. 1

B. 32

C. 53

D. 40

Answer: B



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16. The equation of the external bisector of $\angle BAC$ to $\triangle ABC$ with vertices $A(5, 2)$, $B(2, 3)$ and $C(6, 5)$ is

A. $2x + y + 12 = 0$

B. $x + 2y - 12 = 0$

C. $2x + y - 12 = 0$

D. $x - 2y - 1 = 0$

Answer: D



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17. Chord joining two distinct point $P(a, 4b)$ and $Q\left(c, -\frac{16}{b}\right)$ (both are variable points) on the parabola $y^2 = 16x$ always passes through a fixed point (α, β) . Then, which of the following statements is correct?

A. $\alpha + \beta = 2$

B. $\alpha - \beta = 4$

C. $|\alpha| + |\beta| = 8$

D. $|\alpha| = |\beta|$

Answer: B



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18. A plane $P = 0$ passing through the point $(1, 1, 1)$ is perpendicular to the planes $2x - y + 2z = 5$ and $3x + 6y - 2z = 7$. If the distance of the point $(1, 2, 3)$ from the plane $P = 0$ is k units, then the value of $34k^2$ is equal to

A. $\frac{8}{\sqrt{17}}$

B. 16

C. 64

D. 128

Answer: D



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19. Let the complex numbers Z_1, Z_2 and Z_3 are the vertices A, B and C respectively of an isosceles right - angled triangle ABC with right angle at C, then the value of

$$\frac{(Z_1 - Z_2)^2}{(Z_1 - Z_3)(Z_3 - Z_2)}$$
 is equal to

A. 2

B. 1

C. -2

D. -1

Answer: A



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20. Let A be the centre of the circle $x^2 + y^2 - 2x - 4y - 20 = 0$. If the tangents at the points $B(1, 7)$ and $D(4, -2)$ on the

circle meet at the point C, then the perimeter of the quadrilateral ABCD is

A. 60 units

B. 20 units

C. 40 units

D. 50 units

Answer: C



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21. If the coefficient of x^6 in the expansion of $(2 + x)^3(3 + x)^2(5 + x)^3$ is K, then the value of $\frac{K}{100}$ is

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22. The maximum value of x that satisfies the equation $\sin^{-1}\left(\frac{2\sqrt{15}}{|x|}\right) = \cos^{-1}\left(\frac{14}{|x|}\right)$ is

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23. The number of all possible symmetric matrices of order 3×3 with each entry 1 or 2 and whose sum of diagonal elements is equal to 5, is



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24. The mean of 40 observations 20 and their standard deviation is 5. If the sum of the square of the observations k , then the value of

$\frac{k}{1000}$ is





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25. If $I_n = \frac{d^n}{dx^n}(x^n \ln x)$, then the value of $\frac{1}{50}(I_7 - 7I_6)$ is equal to



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