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India's Number 1 Education App

MATHS

BOOKS - NTA MOCK TESTS

NTA TPC JEE MAIN TEST 45

Mathematics

1. Coefficient of x^{25} in the expansion of expression

$\sum_{r=0}^{50} {}^{50}C_r(2x-3)^5(2-x)^{50-4}$ is

A. ${}^{50}C_{25}$

B. $-{}^{50}C_{24}$

C. $-{}^{5}C_{25}$

D. $-{}^{50}C_{30}$

Answer: C

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2. Arg $\left(i^{i^i}\right)$ is equal to

A. 0

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

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

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

Answer: C

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3. If A and B are square matrices of same order such that $|A| = |B| = 1$ and $A(adjA + adjB) = B$. Then the value of $|A + B|$ is

A. 1

B. 2

C. 4

D. None of these

Answer: A

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4. Am unbiased coin is tossd 6 times,the probability that 3rd head appears on the 6th trail is

A. $\frac{5}{16}$

B. $\frac{5}{32}$

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

D. $\frac{5}{64}$

Answer: B

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5. If α and β are the real roots of the equation $x^2 - (k-2)x + \left(k^2 + 3k + 5\right)$ find the

$= 0 (k \in R)$

maximum and minimum values of $\left(\alpha^2 + \beta^2\right)$

A. $18, 50/9$

B. $18, 25/9$

C. $27, 5/9$

D. None of these

Answer: A

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6. If $x, y, z \in R^+$ and $16\left(16x^2 + y^2 - 4xy\right)$

then $= z(16x + 4y - z)$

A. y,z,x are in A.P

B. y,z,x are in G.P.

C. x,y,z are in A.P.

D. x,y,z are in G.P

Answer: D

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7. Let $A = \{\phi, \{\phi\}, \{\phi, \{\phi\}\}\}$, where ϕ is an null set then

A. $\phi \subseteq A, \phi \in A, (\phi) \in A, \{\phi\} \subseteq A$ is true

B. $\phi \in A$ but $\phi \subseteq A$

C. $\{\phi\} \in A$ but $\phi \subseteq A$

D. A is a null set

Answer: A

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8. The circles $x^2 + y^2 - 2x - 15 = 0$ and $x^2 + y^2 + 4y + 3 = 0$ have

A. no common tangent

B. one common tangent

C. three common tangents

D. four common tangents

Answer: A

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9. The equation

$$\left|\sqrt{(x-2)^2+(y-1)^2}-\sqrt{(x+2)^2+y^2}\right|=c$$

will represent a hyperbola if

A. $c \in (0, 6)$

B. $c \in (6, 5)$

C. $c \in (0, \sqrt{7})$

D. None of these

Answer: C

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10. The straight line $y = m(x - a)$ meets the parabola $y^2 = 4ax$ in two distinct points for

A. all $m \in R$

B. all $m \in [-1, 1]$

C. all $m \in R - \{0\}$

D. None of these

Answer: C

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11. For what value of p, $y^2 + xy + px^2 - x - 2y + p = 0$ represent 2 straight lines

A. 2

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

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

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

Answer: C

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12. The equation of the image of the plane $x - 2y + 2z - 3 = 0$ in the plane $x + y + z + 1 = 0$ is

A. $x - 8y + 4z - 7 = 0$

B. $x - 8y + 4z - 11 = 0$

C. $x + 8y - 4z - 7 = 0$

D. $x + 8y - 4z - 11 = 0$

Answer: B

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13. Let P is any arbitrary point on the circumcircle of a given equilateral triangle ABC of side length l units, then $\left|\overrightarrow{PA}\right|^2 + \left|\overrightarrow{PB}\right|^2 + \left|\overrightarrow{PC}\right|^2$ is always equal to

A. $2l^2$

B. $2\sqrt{3}l^2$

C. l^2

D. $3l^2$

Answer: A

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14. $\lim_{x \to \infty} \left(\frac{x^{2013}}{e^{3x}} + \left(\cos \frac{2}{x} \right)^{x^2} \right)$ is

A. 0

B. e^3

C. e^2

D. e^{-2}

Answer: D

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15. If x and y are independent variables and $f(x) = 1 + \int_0^1 \left(x^2y^2 + x\right) f(y)dy$ be a continuous and differentiable function, then $f'(0)$ is

A. $\frac{164}{57}$

B. $\frac{25}{19}$

C. $\frac{38}{73}$

D. $\frac{91}{103}$

Answer: A

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16. The degree of differential equation satisfying the relation $\sqrt{1+x^2}+\sqrt{1+y^2}$ is $=\lambda\left(x\sqrt{1+y^2}-y\sqrt{1+x^2}\right)$

A. 1

B. 2

C. 3

D. 4

Answer: A

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17. If $\int e^{x^2}\left(2-\frac{1}{x^2}\right)dx = e^{x^2}f(x)+C$ and $f\left(\frac{1}{2}\right)=2$, then $f(1)$ is equal to (where C is an arbitrary constant)

A. 1

B. -1

C. 2

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

Answer: A

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18. The value of expression $\frac{1}{\sqrt{3}\sin(250^\circ)} + \frac{1}{\cos(290^\circ)}$ is

A. $\frac{\sqrt{3}}{4}$

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

C. $\sqrt{3}$

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

Answer: B

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19. If $4^{\cos^2 x + \cos^4 x + \cos^6 x + \ldots\ldots\ldots\ldots + \infty}$ satisfies the equation $t^2 - 20t + 64 = 0$ then number of $(x \neq n\pi)$ values of x in $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$ are

A. 2

B. 4

C. 6

D. 18

Answer: B

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20. Suppose

$3\sin^{-1}(\log_2 x) + \cos^{-1}(\log_2 y) = \frac{\pi}{2}$ and

$\sin^{-1}(\log_2 x) + 2\cos^{-1}(\log_2 y) = \frac{11\pi}{6}$,

then the value of $\frac{1}{x^2} + \frac{1}{v^2}$ is

A. 2

B. 4

C. 6

D. 8

Answer: C

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21. If $f(x), g(x)$ & $h(x)$ are second degree polynomials and

$$\Delta(x) = \begin{vmatrix} f(x) & g(x) & h(x) \\ f'(x) & g'(x) & g'(x) \\ f''(x) & g''(x) & h''(x) \end{vmatrix}$$, then the degree of $\Delta(x)$ is?

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22. If the polynomial $2x^3 - 3(a+1)x^2 + 6ax - 12$ has a local maximum at x_1 and a local minimum at x_2 and if$2x_1 = x_2$, then the value of 2a such that $a < 1$ is

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23. If $y = \sin 3x + b\cos 3x$ satisfies $\frac{d^2y}{dx^2} + 4\frac{dy}{dx} + 3y = 10\cos 3x$ then find the value of $3(a+b)$

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24. $\int_0^{\infty} \frac{dx}{\left(x+\sqrt{1+x^2}\right)^n} = \frac{kn}{n^2-1}$ where $n \in N$ and $n > 1$, then the value of k is

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25. There are two sets of observation with term $\{x_r, f_r\}$ and $\{y_r, f_r\}$ (where x_r and y_r are observation with their respective frequency f_r) Now if $x_r = 2^r$ and $y_r = 2^r - 2$

and $f_r = {}^nC_r$ If the sets are having their variance V_A and V_B respectively, then find the value of $\frac{V_a + 50V_B}{4V_B}$

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26. The normal at the end point of a latus rectum of an ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ passes through the end point of its minor axis. Find the value of $e^2 + e^4$.

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27. The area in sq. units inside the parabola $5x^2 - y = 0$ but outside the parabola $2x^2 - y + 9 = 0$ is A. find $\frac{A^2}{12}$

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28. Consider the areas of the four triangles obtained by drawing the diagonals AC and BD of an isosceles trapezium ABCD are in GP. The product of these areas, taken two at the time are computed. If among the six products so obtained two products are 1296 and 576 ten

the suqre root of the maximum possible area of the trapezium to the nearest integer is .....

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29. Let $A = \{1, 2, 3, 4, 5\}$ and f be one one function from $A \to A$. If number of such functions for whch $f(x) \neq K \forall k \in A$ is 11P, then the value f P is

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30. The function f defined as $f(x) = \sqrt{\log_{0.4}\left(\frac{x-1}{x+5}\right) \times \frac{1}{x^2-36}}$ has domain as the union of two intervals, of unequal length. Then the length of the smaller interval will be:

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