MATHS

BOOKS - NTA MOCK TESTS

NTA JEE MOCK TEST 34

Mathematics

1. The value of $\int_{\pi}^{2\pi} [2\sin x]dx$ is equal to (where $[.]$ represents the greatest integer function)

A. $-\pi$

B. $\frac{5\pi}{3}$

C. $\frac{-5\pi}{3}$

D. -2π

Answer: C

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2. If $\log_{\cos x} \sin x \geq 2$ and $0 \leq x \leq 3\pi$, then the value of $\sin x$ lies in the interval $\left(0, \frac{\sqrt{a}-b}{2}\right]$ then value of a-b is

A. 3

B. 4

C. 5

D. None of these

Answer: B

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3. If

$1^2 + 2^2 + 3^2 + + 2003^2 = (2003)(4007)(334) and (1)(2003) + (2)(2002) +$

equals 2005 b. 2004 c. 2003 d. 2001

A. 2005

B. 2004

C. 2003

D. 2001

Answer: A

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4. The population $p(t)$ at a time t of a certain mouse species satisfies the differential equation $\frac{dp(t)}{dt} = 0.5p(t) - 450.$ If $p(0) = 850.$ Then the time at which the population becomes zero is

A. $\frac{1}{2}\ln 18$

B. $\ln 18$

C. $2\ln 18$

D. $\ln 9$

Answer: C

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5. If the area (in sq. units) of the triangle formed by the intersection of a line parallel to the x - axis and passing through the point $P(h, k)$ with the line $y = x$ and $x + y = 2$ is $4h^2$, then the locus of the point P is

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6. The value of $\int \frac{\sin x - \cos x}{\sqrt{\sin 2x}} dx$ is equal to

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7. The projection of the line $\frac{x-1}{2} = \frac{y+1}{1} = \frac{z-2}{3}$ on a plane P is $\frac{x-1}{1} = \frac{y+1}{2} = \frac{z-2}{1}$, then the equation of the plane P is

A. $5x - 8y + 11z = 35$

B. $5x + 8y - 21z + 45 = 0$

C. $5x + 8y + 11z = 35$

D. $5x - 8y + 21z = 45$

Answer: A

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8. Consider the function $f(x) = (\sin 2x)^{\tan^2 2x}, x \in \frac{\pi}{4}$. The value of $f\left(\frac{\pi}{4}\right)$ such that f is continuous at $x = \frac{\pi}{4}$ is

A. $\sqrt{e}$

B. $1/\sqrt{e}$

C. 2

D. None of these

Answer: B

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9. Let $A = \begin{bmatrix} -1 & 2 & -3 \\ -2 & 0 & 3 \\ 3 & -3 & 1 \end{bmatrix}$ be a matrix, then $|a|adj\left(A^{-1}\right)$ is equal to

A. $O_{3\times 3}$

B. $\begin{bmatrix} -1 & 2 & -3 \\ -2 & 0 & 3 \\ 3 & -3 & 1 \end{bmatrix}$

C. I_3

D. $\begin{bmatrix} -3 & -3 & 1 \\ 3 & 0 & -2 \\ -1 & 2 & -3 \end{bmatrix}$

Answer: B

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10. A tangent having slope of $-\frac{4}{3}$ to the ellipse $\frac{x^2}{18}+\frac{y^2}{32}=1$ intersects the major and minor axes at points $AandB$, respectively. If C is the center of the ellipse, then find area of triangle ABC.

A. 48 sq. units

B. 9 sq. units

C. 24 sq. units

D. 16 sq. units

Answer: C

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11. The locus of a point z represented by the equation $|z-1|=|z-i|$ on the argand plane is $\left(\text{where, } z \in C, I=\sqrt{-1}\right)$

A. a circle of radius 1

B. an ellipse with foci at 1 and $-i$

C. a line passing through the origin

D. a circle on the line joining 1 and $-i$ as diameter

Answer: C

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12. If $\left(1+x+x^2\right)^{25} = a_0 + a_1 x + a_2 x^2 + \ldots\ldots\ldots\ldots\ldots\ldots a_{50} x^{50}$

then the value of

$a_0 + a_2 + a_4 + \ldots\ldots\ldots\ldots + a_{50}$ is

A. odd and of the form 3n

B. odd and of the form $(3n-1)$

C. odd and of the form $(3n+1)$

D. even

Answer: D

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13. Let $f(x) = 2x + 1.\ \forall x,$ then the solution of the equation $f(x) = f^{-1}(x)$ is

A. $x = -1$

B. $x = 2$

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

D. $x = 3$

Answer: A

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14. A bag contains 5 balls of unknown colours. A ball is drawn at random from it and is found to be red. Then the probability that all tha balls in the bag are red, is

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

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

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

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

Answer: D

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15. The set of points on the axis of the parabola $y^2 - 2y - 4x + 5 = 0$ from which all the three normals drawn to the parabola are real and distinct, is

A. $\{(x, 1) : x > 3\}$

B. $\{(x, -1) : x \geq 1\}$

C. $\{(x, 3) : x \geq 1\}$

D. $\{(x, -3) : x \geq 3\}$

Answer: A

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16. Let P be a non - singular matrix such that $I + P + P^2 + \ldots\ldots P^n = O$ (where O denotes the null matrix), then P^{-1} is

A. P^n

B. $-P^n$

C. $-\left(1 + P + P^2 + \ldots\ldots + P^n\right)$

D. None of these

Answer: A

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17. If the mean of 10 observation is 50 and the sum of the square of the deviations of observation from the mean is 250, then the coefficient of variation of these observation is

A. 25

B. 50

C. 10

D. 5

Answer: C

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18. If $\vec{a} = \frac{3\hat{i} - \hat{j}}{\sqrt{10}}$ and $\vec{b} = \frac{\hat{i} + 3\hat{j} + \hat{k}}{\sqrt{11}}$, then the value of $\left(2\vec{a} + \vec{b}\right).\left[\left(\vec{a} \times \vec{b}\right) \times \left(\vec{a} - 3\vec{b}\right)\right]$

A. 5

B. 7

C. 8

D. 9

Answer: B

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19. The area bounded by the curve $a^2y = x^2(x + a)$ and the x-axis is

A. $\frac{a^2}{3}$ sq. units

B. $\frac{a^2}{4}$ sq. units

C. $\frac{3a^2}{4}$ sq. units

D. $\frac{a^2}{12}$ sq. units

Answer: D

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20. The denominator of a fraction exceeds the square of the numberator by 16, then the least value of the fraction is

A. $-\frac{1}{4}$

B. $-\frac{1}{8}$

C. $\frac{1}{12}$

D. $\frac{1}{16}$

Answer: B

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21. The centres of two circles C_1 and C_2 each of unit radius are at a distance of 6 unit from each other. Let P be the mid-point of the line segment joining the centres of C_1 and C_2 and C be a circle touching circles C_1 and C_2 externally. If a common tangent to C_1 and C passing through P is also a common tangent to C_2 and C, then the radius of the circle C, is

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22. If the value of the expression $\tan\left(\frac{1}{2}\cos^{-1}.\frac{2}{\sqrt{5}}\right)$ is in the form of $a+\sqrt{b}$ where $a, b \in Z$, then the value of $\frac{a+b}{b}$ is

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23. Let $f(x) = x^2 - 4x - 3, x > 2$ and $g(x)$ be the inverse of $f(x)$. Then the value $fo(g'),$ where $f(x) = 2,$ is (here, g' represents the first derivative of g)

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24. The number of 4 letter words (with or without meaning) that can be formed from the letter of the work EXAMINATION is

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25. The value of a for which both the roots of the equation $(1 - a^2)x^2 + 2ax - 1 = 0$ lie between 0 and 1, will always be greater than

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