MATHS

BOOKS - NTA MOCK TESTS

NTA JEE MOCK TEST 35

Mathematics

1. If $f(x)||2\sin x - 1| - 2\cot x|$, then the value of $f'\left(\frac{\pi}{3}\right)$ is equal to

A. 0

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

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

D. $\frac{8}{3}$

Answer: C

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2. Let p: Maths is intersting and q : Maths is easy, then $p \Rightarrow (\sim p \vee q)$ is equivalent to

A. It Maths is easy then it is interesting

B. Either Maths is interesting or it easy

C. If Maths is interseting then it is easy

D. Maths is neither interesting nor easy

Answer: C

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3. If $f(x) = \frac{x^2 - [x^2]}{1 + x^2 - [x^2]}$ (where $[.]$ represents the greatest integer part of x), then the range of $f(x)$ is

A. $[0, 1)$

B. $(-1, 1)$

C. $(0, \infty)$

D. $\left[0, \frac{1}{2}\right)$

Answer: D

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4. The area bounded by the curve $y = \sin^{-1}(\sin x)$ and the x - axis from $x = 0$ to $x = 4\pi$ is equal to the area bounded by the curve $y = \cos^{-1}(\cos x)$ and the x - axis from $x = -\pi$ to $x = a$, then the value of a is equal to

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

B. 2π

C. π

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

Answer: C

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5. If both the roots of the equation $x^2 + (a-1)x + a = 0$ are positive, the the complete solution set of real values of a is

A. $(0, \infty)$

B. $(0, 1)$

C. $\left(0, 3 - 2\sqrt{2}\right)$

D. $\left(3 - 2\sqrt{2}, 1\right)$

Answer: C

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6. If $f(x) = \min \left\{\left(\sqrt{9-x^2}, \sqrt{1+x^2}\right)\right\}, \forall, x \in [-3, 3]$ then the number of point(s) where $f(x)$ is non - differentiable is/are

A. 4

B. 3

C. 2

D. 0

Answer: A

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7. Let $f(x) = \sin^{-1}\left\{x\sqrt{1-x} - \sqrt{x\left(1-x^2\right)}\right\}, \forall 0 \leq x \leq 1$

then $f(x)$ is

A. negative

B. positive

C. non - negative

D. non - positive

Answer: D

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8. Let $\vec{q}$ and $\vec{r}$ be non - collinear vectors, If $\vec{p}$ is a vector such that $\vec{p}.\left(\vec{q}+\vec{r}\right)=4$ and $\vec{p}\times\left(\vec{q}\times\vec{r}\right)=\left(x^2-2x+9\right)\vec{q}$ then $+(\sin$ (x, y) lies on the line

A. $x+y=0$

B. $x-y=0$

C. $x=1$

D. $y=\pi$

Answer: C

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9. If z_1, z_2 and z_3 are 3 distinct complex numbers such that $\frac{3}{|z_1-z_2|}=\frac{5}{|z_2-z_3|}=\frac{7}{|z_3-z_1|}$, then the value of $\frac{9}{z_1-z_2}+\frac{25}{z_2-z_3}+\frac{49}{z_3-z_1}$ is equal to

A. 0

B. 1

C. -1

D. 15

Answer: A

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10. An ellipse has foci (4, 2), (2, 2) and it passes through the point P (2, 4).

The eccentricity of the ellipse is

A. $\tan. \frac{\pi}{10}$

B. $\tan. \frac{\pi}{12}$

C. $\tan. \frac{\pi}{6}$

D. $\tan. \frac{\pi}{8}$

Answer: D

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11. If the integral $\int \frac{x^4 + x^2 + 1}{x^2 x - x + 1} dx = f(x) + C$, (where C is the constant of integration and $x \in R$), then the minimum value of $f'(x)$ is

A. 1

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

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

D. 2

Answer: C

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12. The value of $\lim_{n \to \infty} \Sigma_{r=1}^{n} \frac{2^r + 3^r}{6^r}$ is equal to

A. 0

B. 1

C. 6

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

Answer: D

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13. The coefficient of x^4 in the expansion of $\left(1 - x - 2x^2\right)^8$ is

A. 144

B. -144

C. 154

D. -154

Answer: D

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14. The number of roots of the equation $\tan x + \sec x = 2\cos x$ in $[0, 4\pi]$ is

A. 2

B. 4

C. 6

D. 0

Answer: B

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15. If $a = \int_0^1 \frac{\cos(\sin x)}{\sec x} dx$, then the value of $a^2 \cos^2(\sin 1)$ is equal to

A. 0

B. 1

C. $\sin(1)$

D. $\sin(\sin 1)$

Answer: B

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16. If the largest interval of x in which the function $f(x) = x^3 - 3x + 1$ is decreasing is (a, b), then the value of $a + 2b$ is equal to

A. -1

B. 0

C. 1

D. 2

Answer: C

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17. Let $P_1 = x + y + z + 1 = 0, P_2 = x - y + 2z + 1 = 0, P_3 = 3x + y + 4z + 7$ be three planes. Find the distance of line of intersection of planes $P_1 = 0$ and $P_2 = 0$ from the plane $P_3 = 0$.

A. $\frac{2}{\sqrt{26}}$ units

B. $\frac{1}{\sqrt{26}}$ units

C. $\frac{4}{\sqrt{26}}$ units

D. $\frac{7}{\sqrt{26}}$ units

Answer: C

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18. If $x_1, x_2, x_3 \ldots . x_{34}$ are numbers such that $x_i = x_{i+1} = 150, \forall I \in \{1, 2, 3, 4, \ldots . 9\}$ and $x_{i+1} - x_i = -2, \forall I \in \{10, 11, \ldots \ldots . 33\}$, then median of $x_1, x_2, x_3 \ldots \ldots \ldots x_{34}$ is

A. 134

B. 135

C. 148

D. 150

Answer: B

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19. Let $(x_1, y_1), (x_2, y_2), (x_3, y_3)$ and (x_4, y_4) are four points which are at unit distance from the lines $3x - 4y + 1 = 0$ and $8x + 6y + 1 = 0$, then the value of $\frac{\Sigma_{i=1}^{4} x_i}{\Sigma_{i=1}^{4} y_i}$ is equal to

A. 2

B. -2

C. 1

D. -1

Answer: B

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20. Let P_n be s square matrix of order 3 such that $P_n = [a_{ij}]$, where $a_{ij} = \frac{3i+j}{4^n}$ for $1 \leq i \leq 3, 1 \leq j \leq 3$. Then the value of $\lim_{n \to \infty} T_r\left(4P_1 + 4^2P_2 \ldots\ldots\ldots 4^nP_n\right)$ is (where $T_r(A)$ denotes trace of matrix A i.e sum of principle diagonal elements of A)

A. 7

B. 8

C. $\frac{25}{3}$

D. 9

Answer: B

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21. If the length of direct common tangent and transverse common tangent of two circles with integral radii are 3 units and 1 unit respectively, then the reciprocal of the square of the distance between the centres of the circles is equal to

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22. Let $y = f(x)$ satisfies $\frac{dy}{dx} = \frac{x+y}{x}$ and $f(e) = e$ then the value of $f(1)$ is

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23. Let $A = \begin{bmatrix} 1/2 & 3/4 \\ 1 & -1/2 \end{bmatrix}$, then the value of sum of all the elements of A^{100} is

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24. Let $lx - 2y = 1$ intersects the parabola $y^2 = 4ax$ at points P and Q. If PS and QS meet the parabola again at R and T respectively (where S is the focus of $y^2 = 4ax$) then the slope of RT is equal to

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25. If 2 distinct numbers are between 0 to 180 (both inclusive) and the probability that their average is 60 is k, then 1086k is equal to

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