MATHS

BOOKS - NTA MOCK TESTS

NTA JEE MOCK TEST 32

Mathematics

1. Two vertical poles of height 10 m and 40 m stand apart on a horizontal plane. The height (in meters) of the point of intersection of the line joining the top of intersection of the lines joining the top of

each pole to the foot of the other, from this horizontal plane is

A. 8

B. 10

C. 6

D. 4

Answer: A

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2. The total number of solution(s) of the equation $2x + 3\tan x = \frac{5\pi}{2}$ in $x \in [0, 2\pi]$ is/are equal to

A. 1

B. 2

C. 3

D. 4

Answer: C

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3. If $y = |\tan x - |\sin x\,|\,|$, then the value of $\frac{dy}{dx}$ at $x = \frac{5\pi}{4}$ is

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

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

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

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

Answer: B

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4. The value of k for which the sum of the squares of the roots of $2x^2 - 2(k-2)x - (k+1) = 0$ is least is

A. 1

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

C. 2

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

Answer: B

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5. If $\lim_{x \to 0} \frac{\sin 2x - a \sin x}{x^3}$ exists finitely, then the value of a is

A. 0

B. 2

C. 1

D. 4

Answer: B

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6. If $f(x) = \tan^{-1}\sqrt{x^2+4x} + \sin^{-1}\sqrt{x^2+4x+1}$

A. domain of $f(x)$ contains 3 integers only

B. range of $f(x)$ has two elements only

C. $f(x)$ is a constant function $Aax \in R$

D. $f(x)$ contains only two elements in its domain

Answer: D

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7. The function $f(x) = \max . \{(1-x), (1+x), 2\}, x \in (-\infty, \infty)$ is

A. discontinuous at exactly two points

B. differentiable $\forall \xi n R$

C. differentiable $\forall x \in R - \{-1, 1\}$

D. continuous $Aax \in R - \{0, 1, -1\}$

Answer: C

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8. A nine - digit number is formed using the digits 1, 2, 3, 5 and 7. The probability that the product of all digits is always 1920 is

A. $\frac{1}{5^9}$

B. $\frac{7}{5^8}$

C. $\frac{72}{5^9}$

D. $\frac{1}{7!}$

Answer: C

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9. The order of the differential equation of the family of curves $y = a3^{bx+c} + d\sin(x+e)$ is (where, a, b, c, d, e are arbitrary constants)

A. 5

B. 4

C. 3

D. 2

Answer: B

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10. Focus of hyperbola is $(\pm 3, 0)$ and equation of tangent is $2x + y - 4 = 0$, find the equation of hyperbola is

A. $4x^2 - 5y^2 = 20$

B. $5x^2 - 4y^2 = 20$

C. $4x^2 - 5y^2 = 1$

D. $5x^2 - 4y^2 = 1$

Answer: A

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11. Which of the following statement is not a fallacy?

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

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

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

D. $\sim p \vee (\sim p \Rightarrow q)$

Answer: D

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12. The value of $\int \frac{e^{\sqrt{x}}}{\sqrt{x}\left(1+e^{2\sqrt{x}}\right)} dx$ is equal to (where, C is the constant of integration)

A. $\tan^{-1}\left(2e^{\sqrt{x}}\right)+C$

B. $\ln\left(\frac{1+e^{x}}{1-e^{\sqrt{x}}}\right)+C$

C. $2\tan^{-1}\left(e^{\sqrt{x}}\right)+C$

D. $\left(\tan^{-1}x\right)e^{\sqrt{x}}+C$

Answer: C

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13. A plane passes through $(1, -2, 1)$ and is perpendicular to two planes $2x - 2y + z = 0$ and $x - y + 2z = 4$. The distance of the plane from the point (0, 2, 2) is

A. $\frac{3}{\sqrt{2}}$ units

B. $4\sqrt{2}$ units

C. $3\sqrt{2}$ units

D. $2\sqrt{2}$ units

Answer: A

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14. Consider $A = \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 1 \\ 2 & 1 \end{bmatrix}$ such that $AB = BA$. then the value of $\frac{a_{12}}{a_{21}} + \frac{a_{11}}{a_{22}}$ is

A. 2

B. 4

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

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

Answer: C

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15. A line passing through the point (2, 2) encloses an area of 4 sq. units with coordinate axes. The sum of intercepts made by the line on the x and y axis is equal to

A. -2

B. 4

C. -4

D. 2

Answer: C

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16. If 2, 7, 9 and 5 are subtraced respectively from four numbers in geometric progression, then the resulting numbers are in arithmetic progression. The smallest of the four numbers is

A. -24

B. -12

C. 6

D. 3

Answer: A

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17. The coefficient of x^6 in the expansion of $\left(1+x+x^2+x^3\right)(1-x)^6$ is

A. `-10

B. 10

C. 9

D. `-9

Answer: D

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18. The acute angles between the curves $y = 2x^2 - x$ and $y^2 = x$ at (0, 0) and (1, 1) are α and β respectively, then

A. $\alpha - \beta = 0$

B. $\alpha + \beta = 0$

C. $\alpha > \beta$

D. $\alpha < \beta$

Answer: A

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19. The slope of the tangent of the curve $y = \int_x^{x^2} \left(\cos^{-1} t^2\right) dt$ at $x = \frac{1}{\sqrt{2}}$ is equal to

A. $\cos^{-1}\left(\frac{1}{4}\right) - \frac{\pi}{3}$

B. $\cos^{-1}\left(\frac{1}{4}\right) + \frac{\pi}{3}$

C. $\sqrt{2}\cos^{-1}\left(\frac{1}{4}\right) - \frac{\pi}{3}$

D. $\sqrt{2}\cos^{-1}\left(\frac{1}{4} + \frac{\pi}{3}\right.$

Answer: C

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20. The valueof $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} e^{\sec^2 x} \frac{\sin x}{\cos^3 x} dx$ is equal to

A. $\frac{1}{2}e^4$

B. $\frac{1}{2}e^{\frac{4}{3}}$

C. $\frac{1}{2}\left(e^{\frac{4}{3}}-e^4\right)$

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

Answer: C

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21. Let PQ be a focal chord of the parabola $y^2=4ax$. If the centre of a circle having PQ as its diameter lies on the line $\sqrt{5}y+4=0$, then length of the chord PQ, is

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22. If $\lambda \in R$ such that the origin and the non-real roots of the equation $2z^2 + 2z + \lambda = 0$ form the vertices of an equilateral triangle in the argand plane, then $\frac{1}{\lambda}$ is equal to

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23. Let $|A| = 1, \left|\vec{b}\right| = 4$ and $\vec{a} \times \vec{r} + \vec{b} = \vec{r}$. If the projection of $\vec{r}$ along $\vec{a}$ is 2, then the projection of $\vec{r}$ along $\vec{b}$ is

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24. Let a, x, y, z be real numbers satisfying the equations

$ax + ay = z$

$x + ay = z$

$x + ay = az$, where x, y, z are not all zero, then the number of the possible values of a is

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25. If the radisu of the circle passing through the origin and touching the line $x + y = 2$ at $(1, 1)$ is

r units, then the value of $3\sqrt{2}r$ is

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