MATHS

NTA MOCK TESTS ENGLISH

NTA JEE MOCK TEST 42

Mathematics

1. The number of positive integral solution of the inequality $x + y + z \leq 20$ is

A. 1008

B. 1028

C. 1108

D. 1140

Answer: D

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2. A tower AB leans towards west making an angle α with the vertical . The anlgular elevation of B , the topmost point of the tower is β as obsreved from a point C due east of A at distance d from A.If the angular elevation of B from a pont D at a distance 2d due east of C is α , then

A. $\sqrt{3}+1$

B. $\frac{\sqrt{3}+1}{\sqrt{\sqrt{3}-1}}$

C. $\sqrt{3}-1$

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

Answer: C

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3. Consider the function $f(x)=\min\left\{\left|x^2-9\right|,\left|x^2-1\right|\right\}$, then the number of points where $f(x)$ is non - differentiable is/are

A. 0

B. 7

C. 6

D. 4

Answer: C

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4. The consecutive odd integers whose sum is $45^2 - 21^2$ are

A. 43, 45,....., 75

B. 43, 45, ... , 85

C. 43, 45, ... , 85

D. 43, 45, ... , 89

Answer: D

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5. For a complex number Z, if one root of the equation $Z^2 - aZ + a = 0$ is $(1 + i)$ and its other root is α, then the value of $\frac{a}{\alpha^4}$ is equal to

A. 4

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

C. 2

D. -2

Answer: B

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6. Let a,bgt0 and $\alpha = \frac{\hat{i}}{a} + \frac{4\hat{j}}{b} + b\hat{k}$ and $\beta = b\hat{i} + a\hat{t}j + \frac{1}{b}\hat{k}$, then the maximum value of $\frac{10}{5 + \alpha \cdot \beta}$ is

A. $\frac{12}{11}$

B. 2

C. 1

D. $\frac{10}{9}$

Answer: A

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7. If the cofficient of viration of two distribution are 50 ,60 and their arithmetic means are 30 and 25 respectively then the difference of their standard deviaton is

A. $\frac{2075}{3}$

B. $\frac{2075}{9}$

C. $\frac{1000}{9}$

D. $\frac{1075}{3}$

Answer: B

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8. If the centroid of triangles formed by the vertices (1, 2, 3), (2, 1, 0) and (3, 1, 4) is (α, β, γ) then the value of $[\alpha] + [\beta] + [\gamma]$, where [ ] represents the greatest integer function, is _____.

A. -1

B. 1

C. 4

D. -3

Answer: D

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9. If $2, h_1, h_2, \ldots\ldots\ldots, h_{20}6$ are in harmonic progression and $2, a_1, a_2, \ldots\ldots\ldots, a_{20}, 6$ are in arithmetic progression, then the value of $a_3 h_{18}$ is equal to

A. 6

B. 12

C. 3

D. 9

Answer: B

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10. If $\sin A$ and $\cos A$ are the roots of the equation $4x^2 - 3x + a = 0$, $\sin A + \cos A + \tan A + \cot A + \sec A + \text{cosec } A = 7$, then the value of a must be

A. $\frac{7}{25}$

B. $\frac{25}{7}$

C. $\frac{28}{25}$

D. $\frac{25}{28}$

Answer: C

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11. The statement $p \Leftrightarrow q$ is not equivalent to

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

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

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

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

Answer: B

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12. Prove that the curve represented by $x = 3(\cos t + \sin t), y = 4(\cos t - \sin t), t \in R,$ is an ellipse.

A. Ellipse

B. Parabola

C. Hyperbola

D. Circle

Answer: A

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13. The plane $4x + 7y + 4z + 81 = 0$ is rotated through a right angle about its line of intersection with the plane $5x + 3y + 10z = 25$. The equation of the plane in its new position is $x - 4y + 6z = k$ where k is

A. 106

B. -89

C. 73

D. 37

Answer: A

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14. The lengths of the perpendiculars from the points $(m^2, 2m), (mn, m+n)$ and $(n^2, 2n)$ to the line $x + \sqrt{3}y + 3 = 0$ are in

A. Arithmetic progression

B. Geometric progression

C. Harmonic progression

D. None of these

Answer: B

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15. The value of $\int_0^\infty \frac{dx}{1+x^4}$ is equal to

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

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

C. $\frac{\pi}{\sqrt{2}}$

D. $2\pi\sqrt{2}$

Answer: A

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16. The coefficient of x^5 in the expansion of $\left(1+\frac{x}{1!}+\frac{x^2}{2!}+\frac{x^3}{3!}+\frac{x^4}{4!}+\frac{x^5}{5!}\right)^2$ is

A. $\frac{2}{15}$

B. $\frac{4}{15}$

C. $\frac{1}{30}$

D. $\frac{2}{45}$

Answer: B

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

A. $e^{x^2+\frac{1}{x}}+C$

B. $x^2\left(x^2+\frac{1}{x}\right)+C$

C. $xe^{x^2+\frac{1}{x}}+C$

D. $x.\,e^x+C$

Answer: C

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18. If $A \neq B, AB = BA$ and $A^2 = B^2$, then the value of the determinant of matrix $A+B$ is (where A and B are square matrices of order 3×3)

A. 0

B. 1

C. 3^3

D. 3^2

Answer: A

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19. The locus of the mid-point of the chords of the hyperbola $x^2 - y^2 = 4$, that touches the parabola $y^2 = 8x$ is

A. $x^2(x-2) = y^3$

B. $y^2(x-2) = x^3$

C. $x^3(x-2) = y^2$

D. $y^3(x-2) = x^2$

Answer: B

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20. The area bounded by the curve $y = \{x\}$ with the x-axis from $x = \pi$ to $x = 3.8$ is $\left(\frac{\pi}{2} - a\right)(b - \pi)$ sq. units, then the value of $b - a$ is equal to (where $\{.\}$ denotes the fractional part function)

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21. Consider the function $f(x) = \tan^{-1}\left\{\frac{3x-2}{3+2x}\right\}, \forall x \geq 0$. If $g(x)$ is the inverse function of $f(x)$, then the value of $g'\left(\frac{\pi}{4}\right)$ is equal to

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22. If $\int e^{-\frac{x^2}{2}} dx = f(x)$ and the solution of the differential equation $\frac{dy}{dx} = 1 + xy$ is $y = ke^{\frac{x^2}{2}} f(x) + Ce^{\frac{x^2}{2}}$, then the value of k is equal to (where C is the constant of integration)

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23. A subset of 5 elements is chosen from the set of first 15 natural numbers. The probability that at least two of the five numbers are consecutive is λ, then the value of $\frac{22}{\lambda}$ is equal to

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24. If $a, b, c, \lambda \in N$, then the least possible value of $\begin{vmatrix} a^2+\lambda & ab & ac \\ ba & b^2+\lambda & bc \\ ca & cb & c^2+\lambda \end{vmatrix}$ is

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