



MATHS

BOOKS - NTA MOCK TESTS

NTA JEE MOCK TEST 64

Mathematics

1.

If

$$(1 + x + 2x^2)^{20} = a_0 + a_1x + a_2x^2 + \dots + a_{40}x^{40}$$

The value of $a_0 + a_2 + a_4 + \dots + a_{38}$ is

A. $2^{20}(2^{20} + 1)$

B. $2^{20}(2^{20} + 1)$

C. $2^{39} - 2^{19}$

D. $2^{39} + 2^{19}$

Answer: C



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2. The number of natural numbers n for which the equation $(x - 8)x = (n - 10)$ has no real solutions equal to

A. 2

B. 3

C. 4

D. 5

Answer: D



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3. Sum of n terms of the series

$$\frac{1^4}{1.3} + \frac{2^4}{3.5} + \frac{3^4}{5.7} + \dots \text{ is equal to}$$

A.
$$\frac{n(n+1)(2n^2+n+1)}{6(2n+1)}$$

B.
$$\frac{(n+1)(n^2+1)}{6(2n+1)}$$

C.
$$\frac{(n+1)\left((2n+1)^2+1\right)}{8(2n+1)}$$

D.
$$\frac{n(n+1)\left((2n+1)^2+1\right)}{16(2n+1)}$$

Answer: B



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4. If A and B are matrices with 24 and 40 elements respectively, then the number of possible orders of A and B such that AB is defined is

A. 2

B. 3

C. 4

D. 8

Answer: C



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5. Let ABCD be a quadrilateral in which AB is parallel to CD and perpendicular to AD, $AB = 3CD$ and the area of the quadrilateral is 4 square units. If a circle can be drawn touching all the sides of the quadrilateral, then its radius is:

A. 1

B. $\sqrt{5}$

C. $\sqrt{2}$

D. $\sqrt{3}$

Answer: D



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6. If the mean of a set of observations x_1, x_2, \dots, x_n is \bar{X} , then the mean of the observations $x_i + 2i, i = 1, 2, \dots, n$ is

A. $\bar{x} + 2(n + 1)$

B. $\bar{x} + (n + 1)$

C. $\bar{x} + \frac{n + 1}{2n}$

D. None of these

Answer: B



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7. If the range of

$$f(x) = \tan^{-1} x + 2 \sin^{-1} x + \cos^{-1} x \text{ is } [a, b],$$

then

A. $a = \frac{\pi}{4}$

B. $a = -\frac{\pi}{2}$

C. $b = \frac{5\pi}{4}$

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

Answer: C



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8. The tops of two poles of height 40 m and 25 m are connected by a wire. If the wire makes an angle 30° with the horizontal, then the length of the wire is

A. 30 m

B. 20 m

C. 15 m

D. 25 m

Answer: A



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9. The equation of the image of line $y = x$ with respect to the line mirror $2x - y = 1$ is

A. $y = 7x - 5$

B. $y = 7x - 6$

C. $y = 3x - 7$

D. $y = 6x - 5$

Answer: B



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10. The value of

$$\lim_{x \rightarrow \infty} \left[\frac{1^{\frac{1}{x}} + 2^{\frac{1}{x}} + 3^{\frac{1}{x}} + \dots + 10^{\frac{1}{x}}}{10} \right]^{10x} \text{ is}$$

A. 10!

B. 10

C. 9!

D. 0

Answer: A



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11. Two mutually perpendicular tangents of the parabola $y^2 = 4ax$ at the points Q_1 and Q_2 on it meet its axis in P_1 and P_2 . If S is the focus of the parabola, then the value of $\left(\frac{1}{SP_1} + \frac{1}{SP_2}\right)^{-1}$ is equal

A. $\frac{a}{4}$

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

C. a

D. $2a$

Answer: C



12. If $\int_0^1 x^{11} e^{-x^{24}} dx = A$, and $\int_0^1 x^3 e^{-x^8} dx = B$, then the relation between A and B is

A. $A = 3B$

B. $B = 3A$

C. $A + 3B = 0$

D. $B + 3A = 0$

Answer: B



13. Consider a square matrix A of order 2 which has its elements as 0, 1, 2, 4. If the absolute value of $|A|$ is least then, then absolute value of $|\text{adj}(\text{adj}(A))|$ is equal to

A. 0

B. 2

C. 1

D. 4

Answer: B



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14. If $f(x) = \begin{cases} \frac{e^{[2x] + 2x + 1} - 1}{[2x] + 2x + 1} & : x \neq 0 \\ 1 & : x = 0 \end{cases}$, then

(where $[.]$ represents the greatest integer function)



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15. Consider the line

$$L \equiv \frac{x - 1}{2} = \frac{y + 2}{3} = \frac{z - 7}{6}. \quad \text{Point}$$

$P(2, -5, 0)$ and Q are such that PQ is

perpendicular to the line L and the midpoint of PQ lies on line L, then coordinates of Q are

A. $(-4, -5, 2)$

B. $(-3, 0, 1)$

C. $(1, 6, 2)$

D. $(1, 5, 7)$

Answer: A



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16. If three fair dice are thrown and the sum is an odd number, then the probability that all the three dice show an odd number is

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

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

C. $\frac{5}{6}$

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

Answer: D



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17. If the integral

$$I = \int \frac{dx}{x^{10} + x} = \lambda \ln \left(\frac{x^9}{1 + x^\mu} \right) + C, \text{ (where, } C$$

is the constant of integration) then the value of

$\frac{1}{\lambda} + \mu$ is equal to

A. 81

B. $\frac{82}{9}$

C. 18

D. 8

Answer: C



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18. The locus of the mid - points of the parallel chords with slope m of the rectangular hyperbola

$$xy = c^2 \text{ is}$$

A. $y + mx = 0$

B. $y - mx = 0$

C. $my - x = 0$

D. $my + x = 0$

Answer: A



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19. If $y = mx + 5$ is a tangent to $x^3y^3 = ax^3 + by^3$ at point $(1, 2)$, then the value of a is equal to

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

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

C. $\frac{9}{4}$

D. $\frac{18}{7}$

Answer: B



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20. The differential equation $\frac{dy}{dx} = \frac{\sqrt{1-y^2}}{y}$ represents the arc of a circle in the second and the third quadrant and passing through $\left(-\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}\right)$. Then, the radius (in units) of the circle is

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

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

C. 2

D. 1

Answer: D



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21. If $\frac{3 + \cot 80^\circ \cot 20^\circ}{\cot 80^\circ + \cot 20^\circ} = \tan. \frac{\pi}{k}$, then the value of k is (where, $\frac{\pi}{k}$ is an acute angle)



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22. If z is a complex number, then the area of the triangle (in sq. units) whose vertices are the roots of the equation $z^3 + iz^2 + 2i = 0$ is equal to (where, $i^2 = -1$)



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23. A point (α, β, γ) satisfies the equation of the plane $3x + 4y + 7z = 3$. The value of β , such that $\vec{p} = \alpha\hat{i} + \beta\hat{j} + \gamma\hat{k}$ satisfies the relation $\hat{j} \times (\hat{j} \times \vec{p}) = \vec{0}$, is equal to

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24. The value of the integral

$$I = \int_0^{\infty} \frac{dx}{(1 + x^{2020})(1 + x^2)}$$
 is equal to $k\pi$,

then the value of $16k$ is equal to

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25. The number of ordered pairs of positive integers (a, b) , such that their Least Common Multiple is the given positive integer $7^2 \times 11^3 \times 19^4$, is equal to



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