



MATHS

BOOKS - NTA MOCK TESTS

NTA JEE MOCK TEST 65

Mathematics

1. The coefficient of x^8 in the expansion of $(1 + x + x^2 + x^3)^4$ is

A. 30

B. 31

C. 32

D. 36

Answer: B



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2. There are 7 distinguishable rings. The number of possible five - rings arrangements on the four fingers (except the thumb) of one hand (the order of the rings on each finger is to be counted and it is not required that each finger has a ring is equal to

A. 214110

B. 211410

C. 124110

D. 141120

Answer: D

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3. If $\tan^2(x + y) + \cot^2(x + y) = 1 - 2x - x^2$, then (where, $n \in \mathbb{Z}$)

A. $x = 1, y = n\pi \pm \frac{\pi}{4} - 1$

$$\text{B. } x = -1, y = n\pi \pm \frac{\pi}{4} + 1$$

$$\text{C. } x = -1, y = \frac{n\pi}{2} \pm \frac{\pi}{4} - 1$$

$$\text{D. } x = +1, y = \frac{n\pi}{2} \pm \frac{\pi}{4} - 1$$

Answer: B



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4. For two sets A and B, if $n(A) = 7$, $n(B) = 13$ and $n(A \cap B) = 5$, then the incorrect statement is

$$\text{A. } n(A \cup B) = 15$$

$$\text{B. } n(A - B) = 6$$

$$\text{C. } n(A \times B) = 91$$

$$\text{D. } n\{(A \cup B) \times (A \cap B)\} = 75$$

Answer: B



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5. The value of $\lim_{x \rightarrow \frac{\pi}{2}} \frac{\left[\frac{x}{3} \right]}{\ln(\sin x)}$ (where, $[\cdot]$ denotes the greatest integer function)

A. does not exist

B. is equal to 1

C. is equal to 0

D. is equal to -1

Answer: C



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6. Let $g(x) = xf(x)$, where $f(x) = \begin{cases} x^2 \sin \frac{1}{x} & : x \neq 0 \\ 0 & : x = 0 \end{cases}$. At $x = 0$,

A. g is differentiable but g' is not

B. g is differentiable while f is not differentiable

C. both f and g are non differentiable

D. g is differentiable and g' is continuous

Answer: D

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7. Equivalent statement of the statement "If $9 > 10$ then $3^2 = 5$ " will be

A. If $3^2 = 5$ then $9 > 10$

B. $9 < 10$ and $3^2 \neq 5$

C. $9 < 10$ or $3^2 = 5$

D. None of these

Answer: D

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8. Let A be the foot of the perpendicular from the origin to the plane $x - 2y + 2z + 6 = 0$ and $B(0, -1, -4)$ be a point on the plane.

Then, the length of AB is

A. $\sqrt{13}$ units

B. $\sqrt{15}$ units

C. 4 units

D. $\sqrt{17}$ units

Answer: A



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9. Let \vec{a} , \vec{b} and \vec{c} are three non - collinear vectors in a plane such that

$|\vec{a}| = 2$, $|\vec{b}| = 5$ and $|\vec{c}| = \sqrt{29}$. If the angle between \vec{a} and \vec{c} is

θ_1 and the angle between \vec{b} and \vec{c} is θ_2 the angle between \vec{a} and \vec{b}

is θ_2 , where $\theta_1, \theta_2 \in \left[\frac{\pi}{2}, \pi \right]$, then the value of $\theta_1 + \theta_2$ is equal to

A. $\frac{7\pi}{6}$

B. $\frac{4\pi}{6}$

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

D. $\frac{7\pi}{4}$

Answer: C



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10. If the system of equations $2x - 3y + 5z = 12$, $3x_y + pz = q$ and $x - 7y + 8z - 17$ is consistent, then which of the following is not true?

A. $p = 2, q = 7$

B. $p \neq 2, q = 7$

C. $p \neq 2, q \neq 7$

D. $p = 2, q \neq 7$

Answer: A

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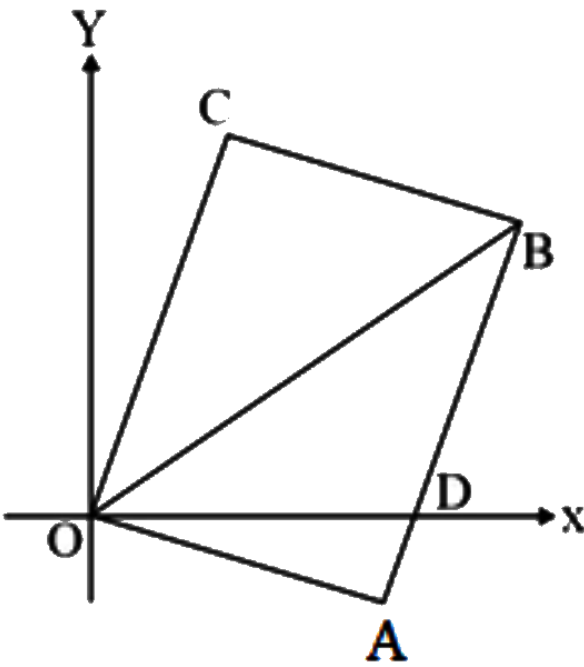
11. If A is symmetric and B is skew-symmetric matrix, then which of the following is/are CORRECT ?

- A. ABA^T is a symmetric matrix
- B. $AB^T + BA^T$ is a symmetric matrix
- C. $(A + B)(A - B)$ is a skew symmetric matrix
- D. $(A + I)(B - I)$ is a skew symmetric matrix

Answer: B

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12. In the figure shown, $OABC$ is a rectangle with $OA = 3$ units, $OC = 4$ units. If $BD = 2.5$ units, then the slope of the diagonal OB is equal to



- A. $\frac{1}{\sqrt{2}}$
- B. $\frac{\sqrt{2}}{\sqrt{3}}$
- C. $\frac{1}{2}$
- D. $\frac{1}{3}$

Answer: C



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13. The line $2x - y + 1 = 0$ touches a circle at the point $(2, 5)$ and the centre of the circle lies on $x - 2y = 4$. The diameter (in units) of the circle is

A. $6\sqrt{5}$

B. $10\sqrt{3}$

C. $4\sqrt{5}$

D. $10\sqrt{2}$

Answer: A



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14. The locus of the point (x, y) whose distance from the line $y = 2x + 2$ is equal to the distance from $(2, 0)$, is a parabola with the length of latus rectum same as that of the parabola $y = Kx^2$, then the value of K is equal to

A. $\frac{\sqrt{5}}{12}$

B. $\frac{\sqrt{5}}{4}$

C. $\frac{4}{\sqrt{5}}$

D. $\frac{12}{\sqrt{5}}$

Answer: A



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15. Let α and β be the roots of $x^2 + x + 1 = 0$, then the equation whose roots are α^{2020} and β^{2020} is

A. $x^2 + x + 1 = 0$

B. $x^2 - x - 1 = 0$

C. $x^2 + x - 1 = 0$

D. $x^2 - x + 1 = 0$

Answer: A



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16. Let the integral

$$I = \int \frac{(2020)^{x + \sin^{-1}(2020)^x}}{\sqrt{1 - (2020)^{2x}}} dx = K^2(2020)^{\sin^{-1}(2020)^x} + \lambda \text{ (where, } \lambda \text{ is}$$

constant of integration), then the value of 2020^K is

A. 2020

B. 2019

C. e

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

Answer: C



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17. The integral $I = \int_{\frac{\pi}{4}}^{\frac{\pi}{2}} \sin^6 x dx$ is satisfies

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

B. $I > \frac{\pi}{4}$

C. $I \in \left(\frac{\pi}{4}, \frac{\pi}{2}\right)$

D. $I \in \left(\frac{\pi}{32}, \frac{\pi}{4}\right)$

Answer: D



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18. The general solution of the differential equation

$$\frac{dy}{dx} = 2y \tan x + \tan^2 x, \forall x \in \left(0, \frac{\pi}{2}\right) \text{ is } yf(x) = \frac{x}{2} - \frac{\sin(2x)}{4} + C,$$

(where, C is an arbitrary constant). If $f\left(\frac{\pi}{4}\right) = \frac{1}{2}$, then the value of $f\left(\frac{\pi}{3}\right)$

is equal to

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

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

C. 2

D. 4

Answer: B



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19. If two points are taken on the minor axis of the ellipse $\frac{x^2}{25} + \frac{y^2}{9} = 1$ at the same distance from the centre as the foci, then the sum of the squares of the perpendicular distance from these points on any tangent to the ellipse is

A. 25

B. 18

C. 50

D. 80

Answer: C



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20. If $(-3, -1)$ is the largest interval in which the function $f(x) = x^3 + 6x^2 + ax + 2$ is decreasing, then $[a]$ is equal to (where, $[.]$ denotes the greatest integer function)

A. 8

B. 9

C. 10

D. 11

Answer: B



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21. Let $f_i(x) = \sin(2p_i x)$ for $i = 1, 2, 3$ & $p_i \in \mathbb{N}$. If it is given that the fundamental periods of $f_1(x) + f_2(x) + f_3(x)$, $f_1(x) + f_2(x)$ and $f_1(x) + f_3(x)$ are π , $\frac{\pi}{3}$ respectively, then the minimum value of $p_1 + p_2 + p_3$ is



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22. For any positive n , let $f(n) = \frac{4n + \sqrt{4n^2 - 1}}{\sqrt{2n + 1} + \sqrt{2n - 1}}$. Then $\left(\frac{\sum_{k=1}^{40} f(k)}{100}\right)$ is equal to

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23. If $\cos^{-1}\left(x - \frac{x^2}{2} + \frac{x^3}{4} - \dots\right) + \sin^{-1}\left(x^2 - \frac{x^4}{2} + \frac{x^6}{4} - \dots\right) = \frac{\pi}{2}$, then x is equal to

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24. A fair coin is tossed once. If it shows head, then 2 fair dice are thrown simultaneously otherwise 3 fair dice are thrown simultaneously. The probability that all the dice show different numbers is k , then $180k$ is equal to

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25. The area bounded by $|x| + |y| = 1$ and $y \geq x^2$ in the first quadrant is $a - \frac{a^2}{2} - \frac{a^3}{3}$ sq. units, then the value of $(2a + 1)^2$ is equal to



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