MATHS

BOOKS - NTA MOCK TESTS

NTA JEE MOCK TEST 50

Mathematics

1. If the coefficients of three consecutive terms in the expansion of $(1+x)^n$ are in the ratio 1:7:42, then find the value of n.

A. 49

B. 50

C. 55

D. 56

Answer: C

2. The sum of the divisors of 9600 is

A. 3048

B. 6120

C. 31620

D. 24384

Answer: C

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3. If the equation of the hypotenuse of a right - angled isosceles triangle is $3x + 4y = 4$ and its opposite vertex is (2, 2), then the equations of the perpendicular and the base are respectively

A. $7x + y = 16 \& x - 7y + 12 = 0$

B. $7x - y = 12 \& x + 7y = 16$

C. $5x + y = 12 \& x - 5y + 8 = 0$

D. $x + 5y = 12 \& 5x - y = 8$

Answer: A

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4. The equation $k\cos x - 3\sin x = k + 1$ is solvable only if

A. $k \in (-\infty, 4)$

B. $k \in (-\infty, 4]$

C. $k \in (4, \infty)$

D. $k \in [4, \infty)$

Answer: B

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5. If $f(x) = \begin{cases} e^{2x^2+x} & : \quad x > 0 \\ ax + b & : \quad x \leq 0 \end{cases}$ is differentiable at $x = 0$, then

A. $a = 1, b = -1$

B. $a = -1, b = 1$

C. $a = 1, b = 1$

D. $a = -1, b = -1$

Answer: C

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6. The equation of the circle which passes through the point A(0, 5) and B(6, 1) and whose centre lies on the line $12x + 5y = 25$ is

A. $3x^2 + 3y^2 + 10x + 6y + 15 = 0$

B. $3x^2 + 3y^2 - 10x - 6y - 45 = 0$

C. $x^2 + y^2 - 6x - 6y + 5 = 0$

D. $x^2 + y^2 - 4x - 3y - 10 = 0$

Answer: B

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7. A function $f: Z \to Z$ is defined as $f(n) = \begin{cases} n+1 & n \in \text{odd integer} \\ \frac{n}{2} & n \in \text{even integer} \end{cases}$. If k $\in$

odd integer and $f(f(f(k))) = 33$, then the sum of the digits of k is

A. 7

B. 5

C. 9

D. 9

Answer: B

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8. The value of $\tan^{-1}\left[\frac{\sqrt{1-\sin x}+\sqrt{1+\sin x}}{\sqrt{1-\sin x}-\sqrt{1+\sin x}}\right]\left(\forall x \in \left[0, \frac{\pi}{2}\right]\right)$ is equal to

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

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

C. $\frac{x}{2}-\pi$

D. $\frac{\pi}{2}-\frac{x}{2}$

Answer: A

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9. The negation of the statement "If I will become famous then I will open a school" is

A. I will become rich and I will not open a school

B. Either I will not become rich or I will not open a school.

C. Neither I will become rich nor I will open a school.

D. I will not become rich or I will open a school.

Answer: A

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10. Let a continous and differentiable function $f(x)$ is such that $f(x)$ and $\frac{d}{dx}f(x)$ have opposite signs everywhere. Then,

A. $f'(x)$ is always increasing

B. $f(x)$ is always increasing

C. $|f(x)|$ is non - decreasing

D. $|f(x)|$ is decreasing

Answer: D

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11. The value of $\int \frac{1}{(2x-1)\sqrt{x^2-x}} dx$ is equal to (where c is the constant of integration)

A. $\sec^{-1}(x-1)+c$

B. $\sec^{-1}(2x-1)+c$

C. $\tan^{-1} x + c$

D. $\tan^{-1}(2x-1)+c$

Answer: B

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12. Find the equation of the tangent to the parabola $y^2 = 4x + 5$ which is parallel to the straight line $y = 2x + 7$

A. $y = 2x$

B. $y = 2x - 3$

C. $y = 2x + 3$

D. $y = 2x + 5$

Answer: C

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13. The area of the smaller part of the circle $x^2 + y^2 = 2$ cut off by the line $x = 1$ is

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

B. $\left(\frac{\pi}{2} - 1\right)$ sq. units

C. $\left(\frac{\pi}{2} + 1\right)$ sq. units

D. $\left(\frac{\pi}{2} - \frac{1}{2}\right)$ sq. units

Answer: B

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14. If a and b are arbitrary constants, then the order and degree of the differential equation of the family of curves $ax^2 + by^2 = 2$ respectively are

A. 2, 2

B. 1, 2

C. 1, 1

D. 2, 1

Answer: D

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15. $\vec{a}$, $\vec{b}$ and $\vec{c}$ are coplanar unit vectors. A unit vector $\vec{d}$ is perpendicular to them. If $\left(\vec{a} \times \vec{b}\right) \times \left(\vec{c} \times \vec{b}\right) = \frac{3}{26}\hat{i} - \frac{2}{13}\hat{j} + \frac{6}{13}\hat{k}$ and the angle between $\vec{a}$ and $\vec{b}$ is 30°, then $\vec{c}$ is equal to

A. $\frac{3}{13}\hat{i} - \frac{4}{13}\hat{j} + \frac{12}{13}\hat{k}$

B. $\frac{2}{7}\hat{i} - \frac{3}{7}\hat{j} + \frac{6}{7}\hat{k}$

C. $3\hat{i} - 4\hat{j} + 12\hat{k}$

D. $\frac{1}{\sqrt{3}}\hat{i} - \frac{1}{\sqrt{3}}\hat{j} + \frac{1}{\sqrt{3}}\hat{k}$

Answer: A

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16. Direction cosines to the normal to the plane containing the lines $\frac{x}{2} = \frac{y}{3} = \frac{z}{5}$ and $\frac{x-1}{2} = \frac{y-1}{3} = \frac{z-1}{5}$ are

A. $\frac{2}{\sqrt{14}}, \frac{-3}{\sqrt{14}}, \frac{5}{\sqrt{14}}$

B. $\frac{2}{\sqrt{14}}, \frac{-3}{\sqrt{14}}, \frac{1}{\sqrt{14}}$

C. $\frac{2}{\sqrt{14}}, \frac{-1}{\sqrt{14}}, \frac{1}{\sqrt{14}}$

D. $\frac{3}{\sqrt{13}}, \frac{-2}{\sqrt{13}}, 1$

Answer: B

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17. If α, β and γ are the roots of the equation $x^3 - 3x^2 + 4x + 4 = 0$, then the value of $\begin{vmatrix} a^2+1 & 1 & 1 \\ 1 & \beta^2+1 & 1 \\ 1 & 1 & \gamma^2+1 \end{vmatrix}$ is equal to

A. 32

B. 16

C. 56

D. 64

Answer: C

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18. For the equation $\frac{1-ix}{1+ix} = \sin.\frac{\pi}{7} - i\cos.\frac{\pi}{7}$, if $x = \tan\left(\frac{k\pi}{28}\right)$, then the value of k can be (where $i^2 = -1$)

A. 1

B. 3

C. 5

D. 9

Answer: C

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19. Shubham has 75% chance of attending the annual meet. Shikha has a 90% chance if Shubham also attends otherwise she has a 40%

chance of attending the meet. If I go to the annual meet and see Shikha there, then the probability the Shubam is also there, is

A. $\frac{27}{31}$

B. $\frac{19}{30}$

C. $\frac{1}{5}$

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

Answer: A

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20. Let A and B be two matrices such that the order of A is 5×7. If $A^T B$ and BA^T are both defined, then (where A^T is the transpose of matrix A)

A. order of B^T is 5×7

B. order of $B^T A$ is 7×7

C. order of $B^T A$ is 5×5

D. $B^T A$ is undefined

Answer: B

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21. The value of $\lim_{x \to \infty} \frac{e^{x+1} \log\left(x^3 e^{-x} + 1\right)}{\sin^3(2x)}$ is equal to

(Use e = 2.7)

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22. A continous function $f(x)$ is such that $f(3x) = 2f(x), \forall x \in R.$ If $\int_0^1 f(x)dx = 1,$ then $\int_1^3 f(x)dx$ is equal to

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23. The sum of 50 terms of the series $3 + 7 + 13 + 21 + 31 + 43 + \ldots$ is equal to S_{50}, then the valueof $\frac{S_{50}}{12500}$ is

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24. If θ is the angle between the pair of tangents drawn to the ellipse $3x^2 + 2y^2 = 5$ from the point (1, 2), then the value of $\tan^2\theta$ is equal to

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25. The mean and variance of 5 observations are 6 and 6.8 respectively. If a number equal to mean is included in the set of observations is k, then the value of $\frac{34}{k}$ is equal to

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