MATHS

BOOKS - NTA MOCK TESTS

NTA JEE MOCK TEST 63

Mathematics

1. The slopes of the tangents to the curve $y = (x+1)(x-3)$ at the points where it cuts the x - axis, are m_1 and m_2, then the value of $m_1 + m_2$ is equal to

A. 8

B. -2

C. 2

D. 0

Answer: D

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2. How many 3×3 matrices M with entries from $\{0, 1, 2\}$ are there, for which the sum of the diagonal entries of $M^T Mis5?$ 126 (b) 198 (c) 162 (d) 135

A. 198

B. 126

C. 135

D. 162

Answer: A

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3. If $\vec{a}, \vec{b}, \vec{c}$ are perpendicular to $\vec{b}+\vec{c}, \vec{c}+\vec{a}$ and $\vec{a}+\vec{b}$ respectively and if $\left|\vec{a}+\vec{b}\right|=6, \left|\vec{b}+\vec{c}\right|=8$ and $\left|\vec{c}+\vec{a}\right|=10, then \left|\vec{a}+\vec{b}+\vec{c}\right|$

(A) $5\sqrt{2}$ (B) 50 (C) $10\sqrt{2}$ (D) 10

A. $5\sqrt{5}$

B. 50

C. $10\sqrt{2}$

D. 10

Answer: D

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4. Let $f(x)=\int_0^x (t-1)(t-2)^2 \mathrm{dt}$. If $f(x) \geq k$ for all x and for some k, then the set of exhaustive value of k is

A. $(0, \infty)$

B. $(0, 2)$

C. $(1, \infty)$

D. $\left(-\infty, -\frac{17}{12}\right]$

Answer: D

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5. If $y(x)$ is a solution of $\frac{dy}{dx} - \frac{xy}{1+x} = \frac{1}{1+x}$ and $y(0) = -1$, then the value of $y(2)$ is

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

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

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

D. $-\frac{1}{5}$

Answer: B

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6. The area enclosed by the curve $y^2 = x^4(1 - x^2)$ is

A. $\frac{\pi}{6}$ sq. units

B. $\frac{\pi}{4}$ sq. units

C. $\frac{\pi}{3}$ sq. units

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

Answer: B

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7. Let $x_1, x_2, \ldots, x_n$ be n observation such that $\sum (x_i)^2 = 400$ and $\sum x_i = 40$, then a possible value of n among

the following is

A. 5

B. 1

C. 2

D. 3

Answer: A

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8. The line L given by $\frac{x}{5}+\frac{y}{b}=1$ passes through the point (13,32).the line K is parallel to L and has the equation $\frac{x}{c}+\frac{y}{3}=1$ then the distance between L and K is

A. $\frac{23}{\sqrt{15}}$ units

B. $\sqrt{17}$ units

C. $\frac{17}{\sqrt{15}}$ units

D. $\frac{23}{\sqrt{17}}$ units

Answer: D

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9. If $0 < A < B < \pi, \sin A + \sin B = \sqrt{\frac{3}{2}}$ and $\cos A + \cos B = \frac{1}{\sqrt{2}}$, then A =

A. 15°

B. 30°

C. 45°

D. $22\frac{1^\circ}{2}$

Answer: A

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10. P_1 and P_2 are corresponding points on the ellipse $\frac{x^2}{16} + \frac{y^2}{9} = 1$ and its auxiliary circle respectively. If the normal at P_1 to the ellipse meets OP_2 in Q (where O is the origin), then the length of OQ is equal to

A. 3 units

B. 9 units

C. 4 units

D. 7 units

Answer: D

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11. The direction ratios of the normal to the plane passing through the points $(1, -2, 3), (-1, 2, -1)$ and parallel to the line $\frac{x-2}{2} = \frac{y+1}{3} = \frac{z}{4}$ are proportional to

A. 2, 3, 4

B. 4, 0, 7

C. $-2, 0, -1$

D. $2, 0, -1$

Answer: D

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12. The line $y = 2x + c$ is tangent to the parabola $y^2 - 4y - 8x = 4$ at a point whose abscissa is α, then the ordered pair (α, C) isn

A. $\left(-\frac{1}{2}, 4\right)$

B. $\left(-\frac{1}{2}, 5\right)$

C. $(4, 5)$

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

Answer: B

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13. Let $f(x) = x^2 - x + 1, \forall x \geq \frac{1}{2}$, then the solution of the equation $f(x) = f^{-1}(x)$ is

A. $x = 1$

B. $x = 2$

C. $x = \frac{1}{2}$

D. $x = 3$

Answer: A

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14. what are the truth values of $(\sim p \Rightarrow \sim q)$ and $\sim(\sim p \Rightarrow q)$ respectively, when p and q always speak true in any argument ?

A. T, T

B. F, F

C. T, F

D. F, T

Answer: A

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15. Let α, β and γ are the roots of the equation $2x^2 + 9x^2 - 27x - 54 = 0$. If α, β, γ are in geometric progression, then the value of $|\alpha| + |\beta| + |\gamma| =$

A. $\frac{19}{2}$

B. $\frac{21}{2}$

C. 13

D. 11

Answer: B

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16. The value of $\lim_{n \to \infty} \left(\frac{e^{\frac{1}{n}}}{n^2} + \frac{2e^{\frac{2}{n}}}{n^2} + \frac{3e^{\frac{3}{n}}}{n^2} + \ldots + \frac{2e^2}{n} \right)$ is

A. $e^2 - 1$

B. $e^2 + 1$

C. $2e^2 + 1$

D. $2e^2 - 1$

Answer: B

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17. The number of numbers, lying between 99 and 1000 that can be made from the digits 2, 3, 7, 0, 8 and 6 when the digits occur only once in each number, is

A. 100

B. 90

C. 120

D. 80

Answer: A

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18. If $z(1+a)=b+ic$ and $a^2+b^2+c^2=1$, then $[(1+iz)/(1-iz)=$ $\frac{a+ib}{1+c}$ b. $\frac{b-ic}{1+a}$ c. $\frac{a+ic}{1+b}$ d. none of these

A. $\frac{a+ib}{1+c}$

B. $\frac{b-ic}{1+a}$

C. $\frac{a+ic}{1+b}$

D. None of these

Answer: A

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19. The value of $\lim_{x\to\infty}\left(\frac{3x-4}{3x+2}\right)^{\left(\frac{x+1}{3}\right)}$ is

A. $e^{-1/3}$

B. $e^{-2/3}$

C. e^{-1}

D. e^{-2}

Answer: B

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20. If $x^y . y^x = 16$, then the value of $\frac{dy}{dx}$ at (2, 2) is

A. -1

B. 0

C. 1

D. None of these

Answer: A

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21. The ratio of the fifth term from the beginning to the fifth term from the end in the expansion of $\left(\sqrt[4]{2}+\frac{1}{\sqrt[4]{3}}\right)^{n}$ is $\sqrt{6}: 1$ If $n=\frac{20}{\lambda}$, then the value of λ is

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22. Let A and B are two independent events such that $P(B)=\frac{1}{2}$ and $P(A \cap B)=\frac{1}{10}$, then the value of $9P\left(\frac{\overline{A}}{A \cup B}\right)$ is

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23. Find the number of common tangent to the circles $x^2+y^2+2x+8y-23=0$ and $x^2+y^2-4x-10y+9=0$

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24. Let $A = \begin{bmatrix} 0 & 2y & z \\ x & y & -z \\ x & -y & z \end{bmatrix}$ such that $A^T A = I$, then the value of $x^2 + y^2 + z^2$ is

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25. If range of function $f(x) = \sin^{-1} x + 2\tan^{-1} x + x^2 + 4x + 1$ is $[p, q]$, then the value of $(p + q)$ is_____>

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