



MATHS

BOOKS - NTA MOCK TESTS

NTA JEE MOCK TEST 27

Mathematics

1. The number of integral values of a for which the equation $\cos 2x + a \sin x = 2a - 7$ possesses a solution is

A. 2

B. 3

C. 4

D. 5

Answer: D

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2. Equation of chord AB of the circle $x^2 + y^2 = 2$ passing through $P(2, 2)$ such that $\frac{PB}{PA} = 3$, is given by (a) $x = 3y$ (b) $x = y$ (c) $y - 2 = \sqrt{3}(x - 2)$ (d) Non of these

A. $x = 3y$

B. $x = y$

C. $y - 2\sqrt{3}(x - 2)$

D. None of these

Answer: B

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3. The value of $\int \frac{x dx}{(x+3)\sqrt{x+1}}$ is (where , c is the constant of integration)

A. $2\sqrt{x+1} + 3 \tan^{-1} \sqrt{x+1} + c$

B. $2\sqrt{x+1} + 3\sqrt{2} \tan^{-1} \sqrt{\frac{x+1}{2}} + c$

C. $2\sqrt{x+1} - 3\sqrt{2} \tan^{-1} \sqrt{\frac{x+1}{2}} + c$

D. $2\sqrt{x+1} - 3 \tan^{-1} \sqrt{x+1} + c$

Answer: C

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4. If in the expansion of $(1+x)^m(1-x)^n$, the coefficients of x and x^2 are 3 and -6 respectively, the value of m and n are

A. 12

B. 14

C. 16

D. 18

Answer: C



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5. If $P = \{1,2,3,4,5\}$ and $Q = \{a,b,c\}$, then the number of onto functions from P to Q is

A. 150

B. 144

C. 147

D. 154

Answer: A



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6. Let Z is be the set of integers , if $A = \{x \in Z : |x - 3|^{(x^2 - 5x + 6)} = 1\}$ and $B = \{x \in Z : 10 < 3x + 1 < 22\}$, then the number of subsets of the set $A \times B$ is

A. 2^6

B. 2^8

C. 2^{15}

D. 2^9

Answer: A

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7. If $A = \begin{bmatrix} a & b & c \\ b & c & a \\ c & a & b \end{bmatrix}$, $abc = 1$, $A^T A = I$, then find the value of $a^3 + b^3 + c^3$.

A. 2

B. 0

C. 1

D. 4

Answer: D

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8. If two points P & Q on the hyperbola, $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ whose centre is C be such that CP is perpendicular to CQ and $a < b$, then prove that $\frac{1}{CP^2} + \frac{1}{CQ^2} = \frac{1}{a^2} - \frac{1}{b^2}$.

A. $\frac{b^2 - a^2}{2ab}$

B. $\frac{1}{a^2} + \frac{1}{b^2}$

C. $\frac{2ab}{b^2 - a^2}$

D. $\frac{1}{a^2} - \frac{1}{b^2}$

Answer: D



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9. If the standard deviation of 0, 1, 2, 3...9 is K , then the standard deviation of 10, 11, 12, 13....19 is

A. k

B. $k + 10$

C. $k + \sqrt{10}$

D. $10K$

Answer: A



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10. The value of x for which $\sin(\cot^{-1}(1 + x)) = \cos(\tan^{-1} x)$ is

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

B. 1

C. 0

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

Answer: D

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11. If $2^{a_1}, 2^{a_2}, 2^{a_3}, \dots, 2^{a_r}$ are in geometric progression, then

$\begin{vmatrix} a_1 & a_2 & a_3 \\ a_{n+1} & a_{n+2} & a_{n+3} \\ a_{2n+1} & a_{2n+2} & a_{2n+3} \end{vmatrix}$ is equal to

A. 2^5

B. 2^3

C. 0

D. None of these

Answer: C

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12. The solution of the equation $|z| - z = 1 + 2i$ is

A. $\frac{3}{2} + 2i$

B. $\frac{3}{2} - 2i$

C. $3 - 2i$

D. None of these

Answer: B

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13. The unbiased dice is tossed until a number greater than 4 appear.

What is the probability that an even number of tosses is needed?

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

B. $\frac{2}{5}$

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

D. $\frac{2}{3}$

Answer: B



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14. The range of a for which the equation $x^2 + x - 4 = 0$ has its smaller root in the interval $(-1, 2)$ is $(-\infty, -3)$ b. $(0, 3)$ c. $(0, \infty)$
d. $(-\infty, -3) \cup (0, \infty)$

A. $(-\infty, -3)$

B. $(0, 3)$

C. $(0, \infty)$

D. $(-\infty, -3) \cup (0, \infty)$

Answer: A



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15. If volume of parallelopiped whose three coterminous edges are $\vec{u} = \hat{i} + \hat{j} + \lambda\hat{k}$, $\vec{v} = 2\hat{i} + \hat{j} + \hat{k}$, $\vec{w} = \hat{i} + \hat{j} + 3\hat{k}$, is 1 cubic unit then cosine of angle between \vec{u} and \vec{v} is

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

B. $\frac{7}{6\sqrt{3}}$

C. $\frac{5}{7}$

D. $\frac{7}{3\sqrt{3}}$

Answer: B



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16. If $5a + 4b + 20c = t$ then the value of t for which the line $ax + by + c - 1 = 0$ always passes through a fixed point is

A. 0

B. 20

C. 30

D. None of these

Answer: B



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17. The solution of the differential equation $\sin(x + y)dy = dx$ is

A. $y + \tan(x + y) - \sec(x + y) = c$

B. $y - \tan(x + y) - \sec(x + y) = c$

C. $y + \tan(x + y) + \sec(x + y) = c$

D. $y - \tan(x + y) + \sec(x + y) = c$

Answer: D



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18. If $f(x) = [x]^{\{x\}} + \{x\}^{[x]} + \sin(\pi x)$, Where $[.]$ and $\{.\}$ represent the greatest integer function and the fractional part function respectively, then $f'\left(\frac{7}{2}\right)$ is equal to

A. $\sqrt{3} \ln 3 + \frac{\pi}{4}$

B. $\sqrt{3} \ln 3 + \frac{3\pi}{4}$

C. $\sqrt{3} \ln 3 + \pi + \frac{3}{4}$

D. $\sqrt{3} \ln 3 + \frac{3}{4}$

Answer: D



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19. An aeroplane flying horizontally, 1km above the ground, is observed at an elevation of 60° , after 10 seconds, its elevation is observed to be 30° . Find the speed of the aeroplane in km/hr.

A. 240

B. $240\sqrt{3}$

C. $60\sqrt{3}$

D. None of these

Answer: B



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20. The sum to infinity of the series

$$1 + \frac{4}{5} + \frac{7}{5^2} + \frac{10}{5^3} + \dots, \text{ is}$$

A. $\frac{16}{25}$

B. $\frac{11}{5}$

C. $\frac{35}{16}$

D. $\frac{8}{11}$

Answer: C

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21. The value of $\lim_{x \rightarrow 1^+} \frac{\int_1^x |t - 1| dt}{\sin(x - 1)}$ is

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22. If $f(x) = \cos^{-1}(\sin(4 \cos^2 x - 1))$, then $\frac{1}{\pi} f' \left(\frac{\pi}{3} \right) \cdot f \left(\frac{\pi}{10} \right)$ is

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23. If $f(x) = \min \{|x - 1|, |x|, |x + 1|\}$, then the value of $\int_{-1}^1 f(x) dx$ is equal to

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24. If the planes $x - cy - bz = 0$, $cx - y + az = 0$ and $bx + ay - z = 0$ pass through a line, then the value of $a^2 + b^2 + c^2 + 2abc$ is

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25. Let $y = x^3 - 6x^2 + 9x + 1$ be an equation of a curve, then the x-intercept of the tangent to this curve whose slope is least, is

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