MATHS

BOOKS - NTA MOCK TESTS

NTA JEE MOCK TEST 70

Mathematics

1. The term independent of x in the expansion of $(1-x)^2\left(x+\frac{1}{x}\right)$, is

A. $.^{10}C_5$

B. $.^{10}C_6$

C. . $^{11}C_5$

D. . $^{17}C_7$

Answer: C

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2. A box contains 2 white balls, 3 black balls and 4 red balls. The number of ways three balls be drawn from the box, if atleast one black ball is to be included in the draw is ..... .

A. 64

B. 74

C. 54

D. 84

Answer: A

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3. The area (in sq. units) bounded by $y = |\ln x|$ form $x = e$ to $x = \pi$ with the x - axis is

A. $\ln \pi$

B. $\pi \ln \pi$

C. $e \ln \pi$

D. $\pi \ln \pi - \pi$

Answer: D

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4. If $\cos x = \tan y, \cos y = \tan z$ and $\cos z = \tan x$, then $\sin x = 2\sin\theta$ where θ is (where, x, y, z, θ are acuate angles)

A. 15°

B. 18°

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

D. 75°

Answer: B

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5. Let $f(x)$ be a differentiable function on $x \in R$ such that $f(x+y) = f(x).F(y)$ for all, $x, y.$ If $f(0) \neq 0, f(5) = 12$ and $f'(0) = 16,$ then $f'(5)$ is equal to

A. 190

B. 186

C. 196

D. 192

Answer: D

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6. Let $f: R \to B$, be a function defined $f(x) = \tan^{-1}. \frac{2x}{\sqrt{3}(1+x^2)}$, then f is both one - one and onto when B, is the interval

A. $\left(0, \frac{x}{6}\right)$

B. $\left[0, \frac{\pi}{6}\right)$

C. $\left[-\frac{\pi}{6}, \frac{\pi}{6}\right]$

D. $\left(-\frac{\pi}{6}, \frac{\pi}{6}\right)$

Answer: C

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7. Mean deviation of the series $a^2, a^2+d, a^2+2d, \ldots\ldots\ldots\ldots\ldots\ldots, a^2+2nd$ from its mean is

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

B. $\frac{nd}{2n+1}$

C. $\frac{n(n+1)d}{(2n+1)}$

D. $\frac{(2n+1)d}{n(n+1)}$

Answer: C

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8. A tower leans towards west making an angle α with the vertical. The angular elevation of B, the top most point of the tower, is 75° as observed from a point C due east of A at a distance of 20 units. If the angular elevation of B from a point due east of C at a distance of 20 units from C is 45°, then $\tan\alpha$ is equal to

A. $\frac{\sqrt{3}+1}{2}$

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

C. $3-2\sqrt{3}$

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

Answer: C

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9. The acute angle of intersection of the curves $x^2y = 1$ and $y = x^2$ in the first quadrant is θ, then $\tan\theta$ is equal to

A. 1

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

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

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

Answer: D

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10. Let $I = \int \frac{dx}{1 + 3\sin^2 x} = \frac{1}{2}\tan^{-1}(2f(x)) + C$ (where, C is the constant of integration). If $f\left(\frac{\pi}{4}\right) = 1$, then the fundamental period of $y = f(x)$ is

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

B. π

C. 2π

D. $\frac{\pi}{6}$

Answer: B

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11. Let a, b, c and d are in a geometric progression such that $a < b < c < d, a + d = 112$ amd $b + c = 48$. If the geometric progression is continued with a as the first term, then the sum of the first six terms is

A. 1156

B. 1256

C. 1356

D. 1456

Answer: D

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12. The solution of the differential equation $\sin y e^x dx - e^x \cos y dy = \sin^2 y dx$ is (where, c is an arbitrary constant)

A. $e^x \sin y = x + c$

B. $e^x = (x + c)\sin y$

C. $e^x . x = \sin y + c$

D. $e^x . \sin y = x^2 + c$

Answer: B

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13. If $\vec{a}$, $\vec{b}$, $\vec{c}$ be three units vectors perpendicular to each other, then $\left|\left(2\vec{a}+3\vec{b}+4\vec{c}\right).\left(\vec{a}\times\vec{b}+5\vec{b}\times\vec{c}+6\vec{c}\times\vec{a}\right)\right|$ is equal to

A. 18

B. 0

C. 4

D. 32

Answer: D

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14. Let $A = (a_{ij})_{3\times 3}$ and $B = (b_{ij})_{3\times 3}$, where $b_{ij} = \frac{a_{ij} + a_{ji}}{2} Aai, j.$ Number of such matrices A whose elements are selected from the set $\{0, 1, 2, 3\}$ such that $A = B$. Are

A. 2^9

B. 2^{12}

C. 2^6

D. 2^8

Answer: B

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15. A line passes through the point $A(2, 3, 5)$ and is parallel to the vector $2\hat{i} - \hat{j} + \hat{k}$. If P is a point on this line such that $AP = 2\sqrt{6}$, then the coordinates of point P can be

A. $(4, 2, 6)$

B. $(6, 1, 7)$

C. $(-2, 5, -3)$

D. $(2, 3, 5)$

Answer: B

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16. Let PQ be the common chord of the circles $S_1 : x^2 + y^2 + 2x + 3y + 1 = 0$ and $S_2 : x^2 + y^2 + 4x + 3y + 2 = 0$, then the perimeter (in units) of the triangle C_1PQ is equal to $\left(\text{where, } C_1 = \left(-1, \frac{-3}{2}\right)\right)$

A. $\frac{9}{2}$

B. $2\sqrt{2} + 3$

C. $3\sqrt{2} + 3$

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

Answer: B

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17. If the segment intercepted between the lines $x + 6y - 13 = 0$ and $x - y + 3 = 0$ is bisected at (6, 8), then the square of the length of segment is

A. 268

B. 244

C. 212

D. 252

Answer: B

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18. If A and B are square matrices such that $A^{2020} = O$ and $AB = A + B$, then $|B|$ is equal to (where, O is a null matrix)

A. 0

B. 1

C. -1

D. 4

Answer: A

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19. Variable ellipses are drawn with $x = -4$ as a directrix and origin as corresponding foci. The locus of extremities of minor axes of these ellipses is:

A. 1

B. 2

C. $\sqrt{2}$

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

Answer: A

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20. Let the locus of any point P(z) in the argand plane is $arg\left(\frac{z-5i}{z+5i}\right)=\frac{\pi}{4}$. If O is the origin, then the value of $\frac{\max .(OP)+\min .(OP)}{2}$ is

A. $5\sqrt{2}$

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

C. $5+5\sqrt{2}$

D. $10-\frac{5}{\sqrt{2}}$

Answer: B

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21. The number of values of x lying in the inteval $-(2\pi, 2\pi)$ satisfying the equation $1 + \cos 10x \cos 6x = 2\cos^2 8x + \sin^2 8x$ is equal to

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22. If $\left[\sin^{-1} x\right]^2 + \left[\sin^{-1} x\right] - 2 \leq 0$ (where, $[.]$ represents the greatest integral part of x), then the maximum value of x is

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23. If $I = \int_0^{16} \frac{x^{\frac{1}{4}}}{1+\sqrt{x}} dx = k + 4\tan^{-1} m,$ then $3k - m$ is equal to

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24. There are two red, two blue, two white, and certain number (greater than 0) of green socks n a drawer. If two socks are taken at random from the drawer4 without replacement, the probability that they are of the same color is 1/5, then the number of green socks are _____.

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25. A circle is drawn whose centre is on the x - axis and it touches the y - axis. If no part of the circle lies outside the parabola $y^2 = 8x$, then the maximum possible radius of the circle is

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