MATHS

BOOKS - NTA MOCK TESTS

NTA JEE MOCK TEST 61

Mathematics

1. The coefficients of x^{13} in the expansion of

$(1-x)^5\left(1+x+x^2+x^3\right)^4$, is

A. 24

B. 12

C. 6

D. 4

Answer: D

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2. A bag contains 30 tokens numbered serially from 0 to 29. The number of ways of choosing 3 tokens from the bag, such that the sum on them is 30, is

A. 56

B. 44

C. 75

D. 81

Answer: C

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3. Number of roots of the equation $2\sqrt{2x+1} = 2x - 1$ is 0 (b) 1 (c) 2 (d) 3

A. 0

B. 1

C. 2

D. 3

Answer: B

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4. Let the n^{th} term of a series be given by $t_n = \frac{n^2 - n - 2}{n^2 + 3n}, n \leq 3$. Then product $t_3 t_4 \ldots . t_{50}$ is equal to

A. $\frac{1}{5^2.7.13.53}$

B. $\frac{1}{5.7^2.12.53}$

C. $\frac{1}{5^2.7.12.51}$

D. $\frac{1}{5.7^2.13.53}$

Answer: D

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5. The value of $\lim_{n \to \infty} \frac{1^2 - 2^2 + 3^2 - 4^2 + 5^2 \ldots + (2n+1)^2}{n^2}$ is equal to

A. 2

B. 4

C. 6

D. 8

Answer: A

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6. Two ships are sailling in the sea on the two sides of a lighthouse. If the distance between the ships is $10\left(\sqrt{3}+1\right)$ meters and their angle of elevations of the top of the lighthouse are 60° and 45°, then the height

of the lighthouse is (The two ships and the foot of lighthouse are in a straight line)

A. 20 meters

B. $20\sqrt{3}$ meters

C. $10\sqrt{3}$ meters

D. $5\sqrt{3}$ meters

Answer: C

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

A. $x \in [\sin 1, \sin 2]$

B. $x \in [-\sin 1, \sin 1]$

C. $x \in [\sin 1, 1]$

D. $x \in [-\sin 1, \sin 2]$

Answer: C

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8. Let $f: R \to R$ be a function defined as $f(x) = \frac{x^2 - 6}{x^2 + 2}$, then f is

A. one - one but not onto

B. one - one and onto

C. onto but not one - one

D. neither one - one nor onto

Answer: D

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9. If the variate of a distribution takes the values $1^2, 2^2, 3^2, \ldots . n^2$ with frequencies $n, n-1, n-2, \ldots .3, 2, 1$ respectively, then the mean value of the distribution is

A. $\frac{n(n+2)}{3}$

B. $\frac{n(n+1)(n+2)}{6}$

C. $\frac{n+2}{3}$

D. $\frac{(n+1)(n+2)}{6}$

Answer: D

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10. The point of intersection of tangents drawn to the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ at the points where it is intersected by the line $lx + my + n = 0$, is $\left(\frac{-a^2 l}{n}, \frac{b^2 m}{n}\right)$ (b) $\left(\frac{-a^2 l}{m}, \frac{b^2 n}{m}\right)$ $\left(\frac{a^2 l}{m}, \frac{-b^2 n}{m}\right)$ (d) $\left(\frac{a^2 l}{m}, \frac{b^2 n}{m}\right)$

A. $\left(\frac{a^2l}{n}, \frac{b^2m}{n}\right)$

B. $\left(\frac{a^2l}{n}, \frac{b^2m}{n}\right)$

C. $\left(-\frac{a^2l}{n}, \frac{b^2m}{n}\right)$

D. $\left(-\frac{a^2l}{n}, \frac{b^2m}{n}\right)$

Answer: C

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11. The value of the integral $\int_0^{\pi} \frac{e^{|\cos x|} \sin x}{1 + e^{\cot x}} dx$ is equal to

A. $e + 1$

B. $1 - e$

C. $e - 1$

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

Answer: C

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12. The curve $y = f(x)$ in the first quadrant is such that the y - intercept of the tangent drawn at any point P is equal to twice the ordinate of P If $y = f(x)$ passes through $Q(2, 3)$, then the equation of the curve is

A. $x^2y = 12$

B. $xy = 6$

C. $xy^2 = 18$

D. $x + y^2 = 11$

Answer: B

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13. The value of the integral $I = \int \frac{2x^9 + x^{10}}{(x^2 + x^3)^3} dx$ is equal to (where, C is the constant of integration)

A. $\frac{x^4}{2(1+x)^2} + C$

B. $\frac{x^6}{2(x+1)^2}+C$

C. $\frac{x^4}{(x+1)^2}+C$

D. $\frac{x^6}{2(x+1)^3}+C$

Answer: A

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14. If A, B and C are square matrices of same order and I is an identity matrix of the same order, such that $C^2 = CB + AC$ and $AB = I$, then $(C-A)^{-1}$ is equal to

A. $C - A$

B. $C - B$

C. $B - C$

D. $B + I$

Answer: B

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15. The system of equations $\alpha(x-1)+y+z=-1, x+\alpha(y-1)+z=-1$ and $x+y+\alpha(z-1)$ has no solution, if α is equal to

A. -2 or 1

B. -2

C. 1

D. -1

Answer: B

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16. If vectors $4\vec{p}+\vec{q}, 2\vec{p}-3\vec{q}$ and $5\vec{p}-3\vec{q}, 5\vec{p}+3\vec{q}$ are a pair of mutually perpendicular vectors and if the angle between $\vec{p}$ and $\vec{q}$ is θ, then the value of $\sin^2\theta$ is equal to

A. $\frac{3}{5}$

B. $\frac{9}{25}$

C. $\frac{1}{2500}$

D. $\frac{2499}{2500}$

Answer: D

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17. The equation of the plane through the points (2,-1,0), (3,-4,5) parallel to a line with direction cosines proportional to 2,3,4 is 9x-2y-3z=k, where k is

A. 20

B. -20

C. 10

D. -10

Answer: A

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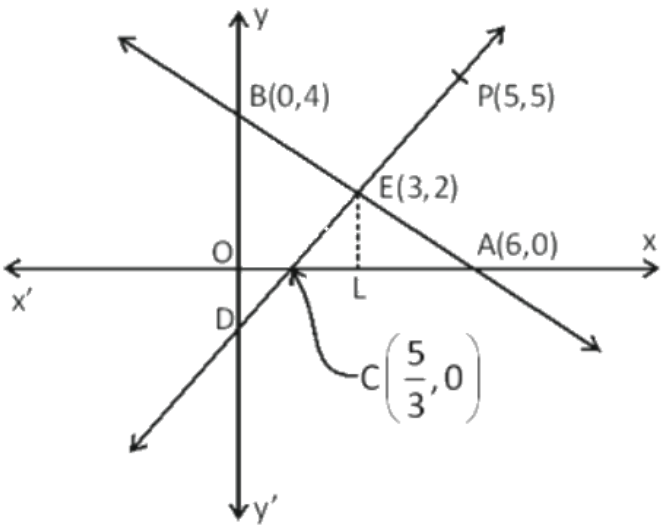
18. The line $2x + 3y = 12$ meets the coordinates axes at A and B respectively. The line through (5, 5) perpendicular to AB meets the coordinate axes and the line AB at C, D and E respectively. If O is the origin, then the area (in sq. units) of the figure OCEB is equal to



A. $\frac{13}{3}$

B. $\frac{23}{3}$

C. 11

D. 7

Answer: B

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19. The extremities of a diagonal of a rectangle which are parallel to the diagonal are

A. $3x - 4y = \pm 5$

B. $3x + 4y = \pm 10$

C. $3x + 4y = \pm 25$

D. $6x - 8y = \pm 25$

Answer: D

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20. The ordinates of points P and Q on the parabola $y^2 = 12x$ are in the ration 1:2 . Find the locus of the point of intersection of the normals to

the parabola at P and Q.

A. $y^2 = \frac{12}{343}(x+6)^3$

B. $y^2 = \frac{12}{343}(x+6)^3$

C. $(y-6)^2 = \frac{12x}{343}$

D. $(y+6)^2 = \frac{12x}{343}$

Answer: A

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21. The area (in sq. untis) bounded by $[x+y] = 2$ with the co - ordinate axes is equal to (where $[.]$ denotes the greatest integer function)

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22. Out of 1000 boys in a school, 300 played cricket, 380 played hockey and 420 played basketball. Of the total, 120 played both basketball and

hockey,100 played cricket and basketball, 70 played cricket and hockey and 56 played all the three games. If the probability of the number of boys who did not play any game is k, then 200k is equal to

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23. If $4\cos 36^\circ + \cot\left(7\frac{1^\circ}{2}\right) = \sqrt{n_1} + \sqrt{n_2} + \sqrt{n_3} + \sqrt{n_4} + \sqrt{n_5} + \sqrt{n_6}$, then the value of $\left(\frac{\Sigma_{i=1}^{6} n_i^2}{10}\right)$ is equal to

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24. The number of solution of $x^3 + 4x - 1 = 0$ in the interval $x \in (-2, 1)$ is

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25. For the complex number Z, the sum of all the solutions of $Z^2 + |Z| = \left(\overline{Z}\right)^2$ is equal to

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