MATHS

BOOKS - NTA MOCK TESTS

NTA TPC JEE MAIN TEST 66

Mathematics

1. $|z_1+z_2|^2+|z_1-z_2|^2$ is equal to

A. $2\left(|z|_1+|z|_2\right)$

B. $2\left(|z_1|^2+|z_2|^2\right)$

C. $|z_1||z_2|$

D. $|z_1|^2+|z_2|^2$

Answer: B

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2. If the system of equation $x - 2y + z = -4, x + y + \lambda z = 4$ and $2x - y + 2z = 2$ has no solution, then λ lies in

A. $\left(0, \frac{3}{4}\right)$

B. $\left(\frac{3}{4}, \frac{5}{4}\right)$

C. $\left(\frac{5}{4}, 2\right)$

D. $(2, 4)$

Answer: B

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3. The number of ways in which three people can divide six identical apples, one orange, one lemon, one banana, one pear, one plum and one apricot among themselves is

A. ${}^{8}C_{3}$

B. $(3)^{6}$

C. ${}^{8}C_{4} \times (3)^{6}$

D. none

Answer: D

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4. The number of integral values of λ for which

$x^2 + y^2 + 2\lambda x + 2(1-\lambda)y + 9s$

$= 0$

the equation of a circle whose radius equal to 4, is

A. 1

B. 2

C. 3

D. 4

Answer: B

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5. Consider the normals drawn at three different points on the parabola $y^2 = 4x$ passing through the point (h, k), then

A. $h < 2$

B. $h > 2$

C. $h < 3$

D. $h > 3$

Answer: B

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6. The locus of the centre of the circle described on any focal chord of a parabola $y^2 = 4ax$ as diameter is

A. $x_2 = 2a(y - a)$

B. $m_2 = -2a(y - a)$

C. $y_2 = 2a(x - a)$

D. $y^2 = -2a(x - a)$

Answer: C

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7. Let E and F be two independent events such that P (E) > P(F). The probability that both E and F happened is $\frac{1}{12}$ and the probability that neither E nor F happens is $\frac{1}{2}$, then

A. $P(E) = \frac{1}{3}, P(F) = \frac{1}{4}$

B. $P(E) = \frac{1}{2}, P(F) = \frac{1}{6}$

C. $P(E) = \frac{1}{2}, P(F) = \frac{1}{8}$

D. none of these

Answer: A

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8. A non-zero vector $\overrightarrow{a}$ is parallel to the line of intersection of the plane determined by the vectors $\hat{i}, \hat{i}+\hat{j}$ and the plane determined by the vectors $\hat{i}-\hat{j}, \hat{i}+\hat{k}$. The angle between $\overrightarrow{a}$ and $\hat{i}-2\hat{j}+2\hat{k}$ is

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

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

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

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

Answer: A

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9. If $y=\tan^{-1}\frac{2^x}{1+2^{2x+1}}$, then $\frac{dy}{dx}$ at x=0 is

A. $-\frac{3}{5}\log 2$

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

C. $-\frac{3}{2}\log 2$

D. None

Answer: A

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10. If A, B, C are angles of a triangle such that

$$\lim_{x \to \infty}\left[\frac{\sin\left(Ax^2 - Bx + C\right)}{\sin(Cx^2 + Bx + A)} + \frac{\cos\left(Ax^2 + Cx + B\right)}{\cos(Cx^2 + Ax + B)}\right]$$

$$\frac{2}{\sqrt{3}}$$

$\angle B = 30^\circ$ and perimeter of triangle is $4 + 2\sqrt{3}$, then the area of triangle is

A. $\sqrt{3}$ sq. units

B. 2 sq. units

C. $\frac{1}{2}$ sq. units

D. $3\sqrt{3}$ sq. units

Answer: A

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11.

$f(x) = \sin x \, \forall x \in \left[0, \frac{\pi}{2}\right], f(x)$ and $+ f(\pi - x) = 2 \forall x \in \left(\frac{\pi}{2}, \pi\right] f(x) =$

If n, m denotes number of points where f(x) is discontinuous and non-differentiable respectively in $[0, 2\pi)$, then value of n + m is

A. 0

B. 1

C. 2

D. 4

Answer: B

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12. Equation of curve passing through P(1,1) represented by any $\frac{dy}{dx} = \frac{2x - 5y}{5x + 2y}$. is

A. $x^2 + y^2 - 5xy + 3 = 0$

B. $x^2 + y^2 + 5xy - 7 = 0$

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

D. $x^2 - y^2 - 5xy + 5 = 0$

Answer: D

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13. If $A_n = \sin n\theta . \sec^n \theta, B_n = \cos \theta then . \sec^n \theta,$

$\frac{B_n - B_{n-1}}{A_{n-1}} + \frac{1}{n} . \frac{A_n}{B_n}$ is equal to

A. 0

B. $\tan \theta$

C. $-\tan \theta + \frac{\tan(n\theta)}{n}$

D. $\tan\theta + \dfrac{\tan(n\theta)}{n}$

Answer: C

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14. The centre of the ellipse $\dfrac{(x+y-2)^2}{16} + \dfrac{(x-y)^2}{9} = 1$ is

A. (0, 0)

B. (1, 1)

C. (1, 0)

D. (0, 1)

Answer: B

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15. If $-\frac{\pi}{2} \leq x \leq \frac{\pi}{2}$, then the two couves $y = \cos x$ and $y = \sin 3x$ intersect at

A. $\left(\frac{\pi}{4}, \frac{1}{\sqrt{2}}\right)$ and $\left(\frac{\pi}{8}, \frac{\cos \pi}{8}\right)$

B. $\left(-\frac{\pi}{4}, \frac{1}{\sqrt{2}}\right)$ and $\left(-\frac{\pi}{8}, \frac{\cos \pi}{8}\right)$

C. $\left(\frac{\pi}{4}, \frac{1}{\sqrt{2}}\right)$ and $\left(\frac{\pi}{8}, -\frac{\cos \pi}{8}\right)$

D. $\left(-\frac{\pi}{4}, \frac{1}{\sqrt{2}}\right)$

Answer: A

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16. If $x = \frac{1}{5}$ the value of $\cos\left(\cos^{-1} x + 2\sin^{-1} x\right)$ is

A. $\sqrt{\frac{24}{25}}$

B. $-\sqrt{\frac{24}{25}}$

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

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

Answer: C

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17. The prabability of getting the sum more than 7 when a pair of dice is tossed is

A. $\frac{1}{9}$

B. $\frac{1}{4}$

C. $\frac{7}{12}$

D. $\frac{5}{12}$

Answer: D

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18. The area bounded by the curve $f(x) = \cos^{-1}(\cos x), x \in [0, 2\pi]$ with the tangent to the curve

$g(x) = |\cos x| at x = \pi,$ is

A. $(\pi + 1)^2$ sq. units

B. $(\pi - 1)^2$ sq. units

C. $\frac{(\pi - 1)(2\pi - 1)}{2}$ sq. units

D. none of these

Answer: B

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19. The variance of the first n natural number is

A. $\frac{n^2 + 1}{12}$

B. $\frac{n^2 - 1}{12}$

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

D. None of these

Answer: B

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20. Consider following statements Statement - I :

(p^~a)^(vpng) is a fallacy.

Statement - II : $(p \rightarrow q) \leftrightarrow (\sim q \rightarrow \sim p)$ is a tautology.

A. Statement - I is true, statement -II is false.

B. Statement - I is false, Statement - II is true.

C. Statement - I true, Statement - II is true, Statement - II is a correct explanation for Statement - I.

D. Statement - I is true, Statement - II is true, Statement - II is not a correct explanation for Statement - I.

Answer: D

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21. Let X be the set consisting of the first 2018 terms of the arithmetic progression 1,6,11, ... , and Y be the set consisting of the first 2018 terms of the arithmetic progression 9,16,23, ... Then $n(X \cup Y) =$_ __ _

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22. Suppose $(5x - 4y)^{23} = \sum_{r=0}^{23} T_{r+1}$, where $T_{r+1} = 23_{Cr}(5x)^{23-r}(-4y)^{r}$ and let x $= \frac{1}{6}$ and $y = \frac{1}{8}$. Then, what will be the possible the value of $\sum_{r=1}^{23}(|T_r| - |T_{r+1}|$

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23. The coefficient of x in

$$f(x) = \begin{vmatrix} x & 1+\sin x & \cos x \\ 1 & \log(1+x) & 2 \\ x^2 & 1+x^2 & 0 \end{vmatrix}, -1 < x \text{ is } \leq 1$$

p then $|p|$ is

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24. The sum of roots of $ax^2 + bx + c = 0$, if the product of roots is 9 and a, b, care in $A.\ P.$, is

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25. If set Aand B have 3 and 6 elements each, then the minimum number of elements in $A \cup B$ is

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26. If the line $y = 3x + \alpha$ touches the hyperbola $9x^2 - 5y^2 = 45$, then $|\alpha|$ is equal to

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27. Consider the real-valued function $f(x) = x^4 + 6x^3 + 35x^2 + 6$ What

+1

is the value of (m +n+p),

where m = number of points of inflection of f (x), n = number of stationary points of f (x), p = number of points of local minima of f (x)

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28. $If \int_0^0 f(x)dx = 5$, then the value of $\sum_{k=1}^{10} \int_0^1 f(x+k-1)dx$ is

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29. If $\int x\sqrt{\frac{2\sin(x^2+1) - \sin 2(x^2+1)}{2\sin(x^2+1) + \sin 2(x^2+1)}}dx$ $= \log f\left(m\left(x^2+1\right)\right) + c$, then $\left[f\left(\frac{m\pi}{2}\right)\right] = \_\_\_\_$, (where [.] represents the greates integer function)

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30. The number of positive integral values of x satisfying the equation $\left[\frac{x}{13}\right]=\left[\frac{x}{17}\right]$ is denoted by n, (where [.] denotes the greatest integer function) then $\frac{n}{3}$ is equal to

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