MATHS

BOOKS - NTA MOCK TESTS

NTA TPC JEE MAIN TEST 68

Mathematics

1. If function g(x) $= x^3 + E^{4x}$ and f(x) = g^{-1}(x), then the value of $f'(1)$ is

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

B. 4

C. $\frac{1}{3+4e^4}$

D. $3 + 4e^4$

Answer: A

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2. If the normal to the ellipse $3x^2 + 4y^2 = 12$ at a point P on it is parallel to the line, $2x + y = 4$ and the tangent to the ellipse at P. passes through $Q(4, 4)$ then PQ is equal to :

A. $\frac{\sqrt{221}}{2}$

B. $\frac{\sqrt{157}}{2}$

C. $\frac{\sqrt{61}}{2}$

D. $5\frac{\sqrt{221}}{2}$

Answer: D

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3. In a circle 20 persons are seated, then the number of ways of selecting 5 persons such that no two persons are consecutive, are

A. ${}^{16}C_5$

B. ${}^{16}C_5 - {}^{16}C_3$

C. ${}^{15}C_5$

D. None

Answer: B

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4. If x + 2 = 6, then x = 4. So, which statement is its converse?

A. If x $\neq$ 4, then x + 2 $\neq$ 6

B. If x = 4, then x + 2 $\neq$ 6

C. If x = 4, then x + 2 = 6

D. If x $\neq$ 4, then x + 2 = 6

Answer: C

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5. if $A = \begin{bmatrix} i & -i \\ -i & i \end{bmatrix}$ and $B = \begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$ then A^8 equals

A. 64 B

B. $-64B$

C. $-128B$

D. 128 B

Answer: D

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6. Let two tangents 3x – 4y + 20 = 0 and X - Y - 3= 0 of a parabola intersect the tangent at vertex at points P (0, 5) and Q (3, 0) respectively, then the length of latus rectum is

A. $\frac{12}{\sqrt{34}}$

B. $\frac{18}{\sqrt{34}}$

C. $\frac{24}{\sqrt{34}}$

D. $\sqrt{34}$

Answer: C

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7. a tangent to the hyperbole $\frac{X^2}{4}-\frac{y^2}{2}=1$ meets x-axis at P and y-axis at Q. Lines PR and QR are deawn such that OPRQ is a rectangle (where O is the origin). Then R lies on :

A. $\frac{4}{x^2}+\frac{2}{y^2}=1$

B. $\frac{2}{x^2}-\frac{4}{y^2}=1$

C. $\frac{2}{x^2}+\frac{4}{y^2}=1$

D. $\frac{4}{x^2}-\frac{2}{y^2}=1$

Answer: C

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8. If (1+3+5+....+p) r) where +(1+3+5+...+q) = (1+3+5+..... each set contains the sum of consecutive odd integers then the smallest possible value of p +q+r

A. 23

B. 21

C. 29

D. 31

Answer: B

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9. A key bunch contains 100 keys exactly one of which opens the door. A man tries to open the door by choosing a key random discarding the wrong key after each trial. The probability that the door opens in 25^{th} trial is -

A. $\frac{1}{100}$

B. $\frac{1}{76}$

C. $\frac{1}{25}$

D. $\frac{1}{25}$

Answer: A

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10. If f(x) be a differentiable function such that $\frac{d^n}{dx^n} f(x)$ exists $\forall x \in R, n \in N$ and $f'(\alpha) = f'(\beta) = 0, f''(\alpha) \cdot f''(\beta) < 0$ then which of the following statements can be true

A. points $(\alpha, f(\alpha)), (\beta, f(\beta))$ are local maxima

B. points $(\alpha, f(\alpha)), (\beta, f(\beta))$ are local minima

C. $(\alpha, f(\alpha)), (\beta, f(\beta))$ are points of inflection

D. none of these

Answer: D

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11. If $f(x)=\frac{2}{x-3}, g(x)=\frac{x-3}{x+4}$ and h(x)=-(2(2x+1))/(x^2+x-12')$then$underset(xto 3)lim[f(x)+g(x)+h(x)]` is equal to

A. -2

B. -1

C. $-\frac{2}{7}$

D. 0

Answer: C

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12. Let $f(x)=x\left(x^2+mx+n\right)+2,$ for all $x \in R$ and $m, n \in R$. If Rolle's theorem holds for $f(x)$ at $x=\frac{4}{3}$ in

$\in [1, 2]$, then (m+n) equals

A. 1

B. 2

C. 3

D. 4

Answer: C

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13. $\int \frac{e^x}{x+2}\{1+(x+2)\log(x+2)\}dx$

A. $e^x \log(x+2) + C$

B. $\frac{e^x}{x+2} + C$

C. $e^x(x+2) + c$

D. $e^x(x-2)+c$

Answer: A

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14. The expression $3\left[\sin^4\left(\frac{3\pi}{2}+\alpha\right)+\sin^4((3\pi)+\alpha)\right]$ is -2 $\left[\sin^6\left(\frac{\pi}{2}+\alpha\right)+\sin^6(5\pi-\alpha)\right]$ equal to

A. 0

B. 1

C. 3

D. $\sin 4\alpha+\cos 6\alpha$

Answer: B

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15. Find the area lying between the curves $y = \tan x, y = \cot x$ and $x -$ axis, $x \in \left[0, \frac{\pi}{2}\right]$

A. $\log 2$

B. $\frac{1}{2}\log 2$

C. $2\log\left(\frac{1}{\sqrt{2}}\right)$

D. None of these

Answer: A

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16. If $\tan(\pi \cos \theta) = \cot(\pi \sin \theta)$, then $\cos^2\left(\theta - \frac{\pi}{4}\right) is$

A. $\frac{1}{16}$

B. $\frac{1}{8}$

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

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

Answer: B

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17. The value of $\cos^{-1}(\cos 12) - \sin^{-1}(\sin 14)$ is

A. 2

B. $8\pi - 26$

C. $4\pi + 2$

D. none of these

Answer: B

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18. The standard deviation of 5 scores 1, 2, 3, 4, 5 is

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

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

C. $\sqrt{2}$

D. $\sqrt{3}$

Answer: C

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19. The degree of the differential equation satisfying `sqrt(1-x^2)+sqrt(1-y^2)=b(x-y) is

A. 1

B. 3

C. 4

D. 0

Answer: A

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20. Let $A = \{(xy) : X + y = p\}$, Be $= \{(x, y) : x^3 + y^3 < p\}$

two sets sch that $A \cap B = \phi$ for any real number p, than the exhastive intervals of p is

A. [-2,2]

B. $\{0\} \cup [2, \infty)$

C. $(-\infty, -2] \cup \{0\}$

D. $\{x ! x \in N \wedge x \leq 3\}$

Answer: B

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21. The numerical value of total rational term in the binomial expansion of $\left(5^{\frac{1}{12}} + 7^{\frac{1}{18}}\right)^{180}$ is equal to:

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22. Let $A = \begin{bmatrix} 3 & 1 \\ 0 & 2 \end{bmatrix}$. If $A^3 - 5A^2 + 9A = B$. Find trace of matrix B.

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23. Suppose $x, y, z > 0$ and distinct and In $x + Iny + Inz = 0,$ if the value of $x^{\frac{1}{\ln y} + \frac{1}{1nz}} \cdot y^{\frac{1}{\ln y} + \frac{1}{1nx}} \cdot z^{\frac{1}{\ln x} + \frac{1}{1ny}}$ is e^{-k}, then k=

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24. If a line crosses the yz- plane at (0, 5, 2) and passes through the points (4, 1, a) and (2, b, 2), then find the value of $\frac{10(a^2 + b^2)}{3}$.

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25. Let Z be a complex number such that $Im(Z) = k$ and $\frac{Z}{Z+n} = 4i$, where K and n are positive integers and $i = \sqrt{-1}$, then the minimum possible value of K will be

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26. If `oversetxunderset0intf(t)dt=(overset1undersetx intt^2f(t)dt)+x^2af'(1/2)=(2a)/(2a+1')then the value os a is :

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27. Three circles has radii as 1, 2, and 3 units, centres at A, B and C respectively and touching each other (pair-wise) externally at D, F and F. Then the circumradius of ΔDEF is :

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28. Let $y = mx + \lambda_i, i = 1, 2, 3, \ldots\ldots\ldots n$ be a family of n parallel lines ubjected to following conditions.

(i) m being a constant

(ii) $\sum_{i-1}^{n} \lambda_i = 1$

A variable line through origin intersects the lines at $P_i(i = 1, 2, 3, \ldots\ldots\ldots, n)$ and $Qbeap \int onvariab \leq l \in esot\hat{}$

sum_(i=1)^nOP_i=OQ

$. IfthelocusofQisastrightl \in ewhichpassesthroughafixedp \int$

(a, b) AAn in R,$thenthevalueof$(a+b)` is

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29. For the eqyation $|x-2|^2+|x-2|-2=0$, the sum of all real roots will be

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