



MATHS

BOOKS - NTA MOCK TESTS

JEE MOCK TEST 7

Mathematics Single Choice

1. If $\log(x + y) = 2xy$, then $y'(0)$ is

A. 1

B. -1

C. 2

D. 0

Answer: A



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2. The value of the parameter a such that the area bounded by $y = a^2x^2 + ax + 1$, coordinate axes, and the line $x=1$ attains its least value is equal to

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

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

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

D. -1

Answer: C



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3. $\int(\sqrt{\tan x} + \sqrt{\cot x}) dx$ is equal to

A. $\sqrt{2} \sin^{-1}(\sin x + \cos x) + C$

B. $\sqrt{2} \cos^{-1}(\sin x - \cos x) + C$

C. $\sqrt{2} \sin^{-1}(\sin x - \cos x) + C$

D. $\sqrt{2} \cos^{-1}(\sin x + \cos x) + C$

Answer: C



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4. Digit at the units place of sum of

$(1!)^2 + (2!)^2 + (3!)^2 \dots\dots + (2008!)^2$ is

A. 5

B. 7

C. 9

D. 6

Answer: B



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5. Let a, b, c , be any real number. Suppose that there are real numbers x, y, z not all zero such that $x = cy + bz$, $y = az + cx$ and $z = bx + ay$.

Then

$a^2 + b^2 + c^2 + 2abc$ is equal to

A. 1

B. 2

C. -1

D. 0

Answer: A



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6. If $f(x) = \sin\left(\lim_{t \rightarrow 0} \frac{2x}{\pi} \cot^{-1}\left(\frac{x}{t^2}\right)\right)$, then

$\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} f(x) dx$ is equal to (where, $x \neq 0$)

A. -2

B. -1

C. 0

D. 2

Answer: B



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7. If $p \rightarrow (\sim p \vee q)$ is false, then the truth values of p and q are respectively

A. F,T

B. F,F

C. T,T

D. T,F

Answer: D



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8. A foot of the normal from the point $(4, 3)$ to a circle is $(2, 1)$ and a diameter of the circle has the equation $2x - y - 2 = 0$. Then the equation of the circle is:

A. $x^2 + y^2 - 4y + 2 = 0$

$$B. x^2 + y^2 - 4y + 1 = 0$$

$$C. x^2 + y^2 - 2x - 1 = 0$$

$$D. x^2 + y^2 - 2x + 1 = 0$$

Answer: C



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9. If x is rational and

$$4\left(x^2 + \frac{1}{x^2}\right) + 16\left(x + \frac{1}{x}\right) - 57 = 0, \text{ then}$$

the product of all possible values of x is

A. 4

B. 3

C. 2

D. 1

Answer: D



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10. Mean and variance of 20 observation are 10 and 4. It was found, that in place of 11, 9 was taken by mistake find correct variance.

A. 3.99

B. 4.01

C. 4.02

D. 3.98

Answer: A



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11. Sum of first 20 terms of

$$\frac{3}{1^2} + \frac{5}{1^2 + 2^2} + \frac{7}{1^2 + 2^2 + 3^2} + \dots \text{ upto 20 terms}$$

is $\frac{k}{21}$, then k is equal to :

A. 240

B. 120

C. 60

D. 80

Answer: B



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12. if $\tan(k+1)\theta = \tan \theta$, then θ belongs to the set

A. $\{n\pi : n \in I\}$

B. $\left\{\frac{n\pi}{2} : n \in I\right\}$

C. $\left\{ \frac{n\pi}{k} : n \in I \right\}$

D. $\left\{ \frac{n\pi}{4} : n \in I \right\}$

Answer: C



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13. If $z + \frac{1}{z} + 1 = 0$, then $z^{2003} + \frac{1}{z^{2003}}$ is equal to

A. 1

B. -1

C. 0

D. None of these

Answer: B



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14. When the elevation of the sun changes from 45° to 30° , the shadow of a tower increases by 60 units then the height of the tower is

A. $30\sqrt{3}$ units

B. $30\sqrt{2}$ units

C. $30(\sqrt{3} + 1)$ units

D. $30(\sqrt{2} + 1)$ units

Answer: C



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15. The value of $\lim_{x \rightarrow \infty} \left(\frac{3x - 4}{3x + 2} \right)^{\left(\frac{x+1}{3} \right)}$ is

A. $e^{-1/3}$

B. $e^{-2/3}$

C. e^{-1}

D. e^{-2}

Answer: B



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16. If $f(x) = \sin x + \cos x$ and $g(x) = x^2 - 1$, then $g(f(x))$ is invertible in the domain .

A. $\left[0, \frac{\pi}{2}\right]$

B. $\left[-\frac{\pi}{4}, \frac{\pi}{4}\right]$

C. $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$

D. $[0, \pi]$

Answer: B



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17.

For

$x \in \mathbb{R}$, $f(x) = |\log 2 - \sin x|$ and $g(x) = f(f(x))$,

then

A. $g'(0) = -\cos(\log 2)$

B. g is not differentiable at $x = 0$

$g'(0) = -\sin(\log 2)$

C. g is not differentiable at $x = 0$

D. $g'(0) = \cos(\log)2$

Answer: D



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18. The differential equation obtained by eliminating the arbitrary constants a and b from

$$xy = ae^x + be^{-x} \text{ is}$$

A. $x \frac{d^2y}{dx^2} + 2 \frac{dy}{dx} - xy = 0$

B. $\frac{d^2y}{dx^2} + 2 \frac{dy}{dx} - xy = 0$

C. $\frac{d^2y}{dx^2} + 2 \frac{dy}{dx} + xy = 0$

D. $\frac{d^2y}{dx^2} + \frac{dy}{dx} - xy = 0$

Answer: A



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19. A relation R is defined from $\{2, 3, 4, 5\}$ to $\{3, 6, 7, 10\}$ by : $x R y \Rightarrow x$ is relatively prime to y . Then, domain of R is

A. $\{2, 3, 5\}$

B. $\{3, 5\}$

C. $\{2, 3, 4\}$

D. $\{2, 3, 4, 5\}$

Answer: D



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20. Solution set of $[\sin^{-1} x] > [\cos^{-1} x]$. where

$[\cdot]$ denotes greatest integer function

A. $\left[\frac{1}{\sqrt{2}}, 1 \right]$

B. $(\cos 1, \sin 1)$

C. $[\sin 1, 1]$

D. None of these

Answer: C



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Mathematics Subjective Numerical

1. If $f(x) = \cos|x| - 2ax + b$ is a function, which increases for all x , then the maximum value of $2a + 1$ is



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2. Find the distance of the point $(-1, -5, -10)$ from the point of intersection of the line $\frac{x-2}{3} = \frac{y+1}{4} = \frac{z-2}{12}$ and plane $x - y + z = 5$. is $13t$, then the value of t equals to



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3. The sum of the binomial coefficients in the expansion of $\left(x^{-\frac{3}{4}} + ax^{\frac{5}{4}}\right)^n$ lies between 200 and 400 and the term independent of x equals 448. The value of a is :-



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4. A biased coin with probability P , ($0 < p, 1$) of heads is tossed until a head appear for the first time. If the probability that the number of tosses required is even is $\frac{2}{5}$ then $p =$



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5. If the straight line drawn through the point $P(\sqrt{3}, 2)$ and making an angle $\frac{\pi}{6}$ with the x-axis

meets the line $\sqrt{3}x - 4y + 8 = 0$ at Q, find the length of PQ.



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