MATHS

BOOKS - NTA MOCK TESTS

NTA JEE MOCK TEST 25

Mathematics

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

A. 0

B. In 2

C. 1

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

Answer: C

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2. The area bounded by $f(x) = \sin^2 x$ and the x - axis from x = a to x = b , where $f''(a) = f''(b) = 0(\forall a, b, \in (0, \pi))$ is

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

B. $\pi + 2$

C. 2

D. $\frac{\pi + 2}{4}$

Answer: D

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3. The domain of the function $f(x) = \frac{1}{9 - x^2} + \log_{20}(x^3 - 3x)$ is

A. $(-\sqrt{3}, 0) \cup (\sqrt{3}, \infty)$

B. $(-\sqrt{3}, 0) \cup (\sqrt{3}, 3)$

C. $(-\sqrt{3}, 0) \cup (3, \infty)$

D. $(-\sqrt{3}, 0) \cup (\sqrt{3}, 3) \cup (3, \infty)$

Answer: D

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4. If for a sample size of 10, $\sum_{i=1}^{10}(x_i - 5)^2 = 350$ and $\sum_{i=1}^{10}(x_i - 6) = 20$, then the variance is

A. 23

B. 24

C. 25

D. 26

Answer: D

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5. If a and b are two real number lying between 0 and 1 such that $z_1 = a + i$, $z_2 = 1 + bi$ and $z_3 = 0$ form an equilateral triangle , then

A. $a = 2 + \sqrt{3}$

B. $a = 4 - \sqrt{3}$

C. a = b

D. $a = 2, b = \sqrt{3}$

Answer: C

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6. If any tangent to the ellipse $25x^2 + 9y^2 = 225$ meets the coordinate axes at A and B such that OA = OB then , the length AB is equal to (where , O is the origin)

A. $\sqrt{17}$ units

B. $\sqrt{34}$ units

C. $2\sqrt{17}$ units

D. $2\sqrt{34}$ units

Answer: C

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7. If $\frac{1}{1!11!}+\frac{1}{3!9!}+\frac{1}{5!7!}=\frac{2^n}{m!}$ then the value of m + n is

A. 18

B. 23

C. 12

D. 22

Answer: D

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8. There are 10 seats in the first row of a theatre of which 4 are to be occupied. The number of ways of arranging 4 persons so that no two persons sit side by side is:

A. 240

B. 480

C. 840

D. 420

Answer: C

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9. Let the curve y = f (x) satisfies the equation $\frac{dy}{dx} = 1 - \frac{1}{x^2}$ and passes through the point $\left(2, \frac{7}{2}\right)$

then the value of f(1) is

A. 3

B. 2

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

D. 1

Answer: A

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10. If a function $F: R \to R$ is defined as $f(x) = \int \frac{x^8 + 4}{x^4 - 2x^2 + 2} dx$ f (0) =1 , then which of the following is correct ?

A. f (x) is an even function

B. f (x) is an onto function

C. f (x) is an odd function

D. f (x) is an many one function

Answer: B

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11. Six fair dice are rolled . The probability that the product of the numbers appearing on top faces is prime is

A. $\frac{1}{2}\left(\frac{1}{6}\right)^4$

B. $\left(\frac{1}{2}\right)^6$

C. $\frac{1}{6^4}$

D. $\frac{1}{2}\left(\frac{1}{6}\right)^5$

Answer: A

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12. If x satisfies the inequality $(\tan^{-1} x)^2 + 3(\tan^{-1} x) - 4 > 0$, then the complete set of values of x is

A. $\left(-\tan 4, \frac{\pi}{4}\right)$

B. $(\infty, \tan 4) \cup \left(\frac{\pi}{4}, \infty\right)$

C. $(\tan 1, \infty)$

D. $(\tan 4, \tan 1)$

Answer: C

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13. Let $2a + 2b + c = 0$, then the equation of the straight line ax + by + c = 0 which is farthest the point (1,1) is

A. y = x

B. y + x = 2

C. y + x = 4

D. y = x + 2

Answer: C

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14. If $x, |x+a|, |x-1|$ are first three terms of an A.P., then the sum of its first 20 terms is

A. 90 or 175

B. 180 or 350

C. 360 or 700

D. 720 or 1400

Answer: B

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15. The difference between the greatest and the least possible value of the expression $3 - \cos x + \sin^2 x$ is

A. $\frac{13}{4}$

B. $\frac{17}{4}$

C. $\frac{9}{4}$

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

Answer: C

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16. The value of $\int_{0}^{12\pi}([\sin t] + [-\sin t])dt$ is equal to

(where [.] denotes the greatest integer function)

A. 12π

B. -12π

C. -10π

D. -6π

Answer: B

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17. For the function $f(x) = \sin x + 2\cos x, \forall \mathrm{x} \in [0, 2\pi]$ we obtain

A. a local point of maxima at $x = \alpha$, where α is in 1^{st} quadrant

B. a local point of maxima at $x = \alpha$, where α is in 3^{rd} quadrant

C. a local point of minima at $x = \alpha$, where α is in 1^{st} quadrant

D. a local point of minima at $x = \alpha$, where α is in 2^{nd} quadrant

Answer: A

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18. Find the equation of the plane containing the lines 2x-y+z-3=0,3x+y+z=5 and at a distance of $\frac{1}{\sqrt{6}}$ from the point (2,1,-1).

A. x + y + z - 3 = 0

B. 2x - y - z - 3 = 0

C. 2x - y + z + 3 = 0

D. 62x + 29y + 19z - 105 = 0

Answer: D

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19. If $\vec{m}_a, \vec{m}_b$ and $\vec{m}_c$ are 3 units vectors such that $\vec{m}_a. \vec{m}_b = \vec{m}_a. \vec{m}_c = 0$ and the angle between $\vec{m}_b. \vec{m}_c$ is $\frac{\pi}{3}$, then then value of $\left|\vec{m}_a \times \vec{m}_b - \vec{m}_a \times \vec{m}_c\right|$ is equal to

A. 1

B. 2

C. 3

D. 4

Answer: A

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20. Let the points A lies on $3x - 4y + 1 = 0$, the point B lines on $4x + 3y - 7 = 0$ and the point C is (-2,5) . If ABCD is a rhombus , then the locus of D is

A. $25\left((x+2)^2 + (y-5)^2\right) = (3x+4y+1)^2$

B. $(3x - 4y + 1)^2 + (4x - 3y - 7)^2 = 1$

C. $(3x - 4y + 1)^2 - (4x - 3y - 7)^2 = 1$

D. $(4x + 3y - 7)^2 + (3x - 4y + 1)^2 = 1$

Answer: A

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21. Let

$$A + 2B = \begin{bmatrix} 2 & 4 & 0 \\ 6 & -3 & 3 \\ -5 & 3 & 5 \end{bmatrix} \text{ and } 2A - B = \begin{bmatrix} 6 & -2 & 4 \\ 6 & 1 & 5 \\ 6 & 3 & 4 \end{bmatrix}$$

, then tr (A) - tr (B) is equal to (where , tr (A) =n trace of matrix x A i.e. . Sum of the principle diagonal elements of matrix A)

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22. Let

$$px^4 + qx^3 + rx^2 + sx + t = \begin{vmatrix} x^2 + 3x & x - 1 & x + 3 \\ x + 1 & -2 & x - 4 \\ x - 3 & x + 4 & 3x \end{vmatrix}$$

be an identity where p,q,r,s and t are constants, then the value of s is equal to

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23. If $S = \sum_{r=1}^{80} \frac{r}{(r^4 + r^2 + 1)}$, then the value of $\frac{6481s}{1000}$ is

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24. If the equation of the tangent at the point P(3,4) on the parabola whose axis is the x - axis is 3x - 4y + 7 = 0 ,then distance of the tangent from the focus of the parabola is

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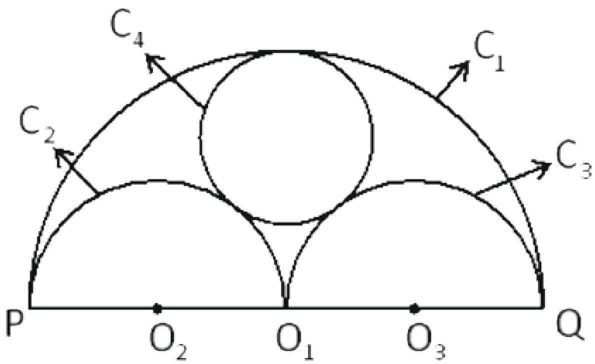
25. In the figure PQ PO_1 and O_1Q are the diameters of semicircles C_1, C_2 and C_3 with centres at O_1, O_2 and O_3 respectively C_1C_2 and C_3 . If PQ = 24 units and the area of the circle C_4 is A sq. units , then the value of $\frac{8\pi}{4}$ is equal ot (here, $PO_1 = O_1Q$)



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