



MATHS

BOOKS - NTA MOCK TESTS

NTA JEE MOCK TEST 19

Mathematics

1. If A and B are square matrices of order 3 such that $|A| = 3$ and $|B| = 2$, then the value of $|A^{-1}adj(3A^{-1})|$ is equal to

A. 27

B. $\frac{27}{4}$

C. $\frac{1}{108}$

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

Answer: A



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2. Which of the following statement is equivalent to the statement "if $2 + 2 = 4$ then India is country" ?

- A. $2 + 2 = 4$ or India is a country
- B. $2 + 2 = 4$ and India is a country
- C. $2 + 2 \neq 4$ or India is a country
- D. $2 + 2 = 4$ or India is not a country

Answer: C



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3. Two points P and Q are lying on the curve $y = \log_2(x + 3)$ in xy plane such that $\vec{OP} \cdot \hat{i} = 1$ and $\vec{OQ} \cdot \hat{j} = 3$, then the value of $\left| \vec{OQ} - 2\vec{OP} \right|$ is (where, "O" is the origin).

A. $\sqrt{6}$

B. $\sqrt{7}$

C. $\sqrt{8}$

D. $\sqrt{10}$

Answer: D



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4. Bag A contains 4 green and 3 red balls and bag B contains 4 red and 3 green balls. One bag is taken at random and a ball is drawn and noted to

be green. The probability that it comes from bag B, is

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

B. $\frac{2}{3}$

C. $\frac{3}{7}$

D. $\frac{1}{3}$

Answer: C



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5. The value of the integral

$$I = \int_0^{\frac{\pi}{4}} [\sin x + \cos x](\cos x - \sin x) dx$$
 is equal

to (where, $[.]$ denotes the greatest integer function)

A. $\sqrt{2}$

B. $2\sqrt{2}$

C. 1

D. $\sqrt{2} - 1$

Answer: D



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6. If the letters of the word CORONA are arranged in all possible ways and these words are written in order of a dictionary, then the word CORONA appears at the serial number

A. 108

B. 110

C. 106

D. 112

Answer: A



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7. The solution of the differential equation $dy - \frac{ydx}{2x} = \sqrt{x}ydy$ is (where , c is an arbitrary constant)

A. $\frac{y}{\sqrt{x}} = y + c$

B. $\frac{y}{\sqrt{x}} = \frac{y^2}{2} + c$

C. $y = y\sqrt{x} + c$

D. $\frac{y}{\sqrt{x}} = -y^2 + c$

Answer: B



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8. If $(\cot^{-1} x)^2 - 7(\cot^{-1} x) + 10 > 0$ then

range of x will be

A. $(-\infty, \cot 2)$

B. $(-\infty, \cot 5)$

C. $(\cot 2, \cot 5)$

D. $(\cot 2, \infty)$

Answer: D



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9. If $\alpha \neq \beta$ but, $\alpha^2 = 4\alpha - 2$ and $\beta^2 = 4\beta - 2$

then the quadratic equation with roots

$\frac{\alpha}{\beta}$ and $\frac{\beta}{\alpha}$ is

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

B. $x^2 - 6x + 1 = 0$

C. $x^2 + 6x - 1 = 0$

D. $x^2 + 4x - 2 = 0$

Answer: B



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10. The sum up to 60 terms of $\frac{3}{1^2} + \frac{5}{1^2 + 2^2} + \frac{7}{1^2 + 2^2 + 3^2} + \dots$ is equal to

A. $\frac{240}{61}$

B. $\frac{180}{17}$

C. $\frac{360}{61}$

D. $\frac{100}{17}$

Answer: C



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11. If $C_0, C_1, C_2, \dots, C_n$ are binomial coefficients in the expansion of $(1 + x)^n$, then the value of

$$C_0 - \frac{C_1}{2} + \frac{C_2}{3} - \frac{C_3}{4} + \dots + (-1)^n \frac{C_n}{n+1} \text{ is}$$

A. 0

B. $\frac{1}{n+1}$

C. $\frac{2^2}{n+1}$

D. $\frac{-1}{n+1}$

Answer: B



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12. The value of the integral

$$\int \left(\frac{\sin x}{x} \right)^6 \left(\frac{x \cos x - \sin x}{x^2} \right) dx$$

(where , c is an arbitrary constant)

A. $\frac{\sin x}{x} + C$

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

C. $\frac{\sin^7 x}{x^7} + C$

D. $\frac{\sin^7 x}{7x^7} + C$

Answer: D



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13. If the difference between the number of subsets of two sets A and B is 120, then $n(A \times B)$ is equal to

A. 21

B. 25

C. 18

D. 24

Answer: A



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14. The function $f: [0, 7] \rightarrow [0, 70]$ where

$$f(x) = x^3 - 12x^2 + 45x, \text{ is}$$

- A. one - one & onto
- B. many - one & onto
- C. one - onto & into
- D. many-one & into

Answer: B



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15. The area (in sq. units) of the region

$$\{(x, y) : y^2 \leq 2x \text{ and } x^2 + y^2 \leq 4x, x \geq 0, y \leq 0\},$$

is

A. $\pi - \frac{4\sqrt{2}}{3}$

B. $\frac{\pi}{2} - \frac{2\sqrt{2}}{3}$

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

D. $\pi - \frac{8}{3}$

Answer: D



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16. The value of $\lim_{x \rightarrow 0} \frac{\log(\sin 5x + \cos 5x)}{\tan 3x}$ is equal to

A. $\frac{10}{3}$

B. $\frac{20}{3}$

C. $\frac{5}{6}$

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

Answer: D



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17. The number of values of p for which the lines

$$x + y - 1 = 0, px + 2y + 1 = 0 \quad \text{and}$$

$$4x + 2py + 7 = 0 \text{ are concurrent is equal to}$$

A. 0

B. 2

C. 1

D. infinite

Answer: C



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18. If $y = \frac{1}{x}$, then the value of

$$\frac{dy}{\sqrt{1+y^4}} + \frac{dx}{\sqrt{1+x^4}} + 3 \text{ is equal to}$$

A. 0

B. 3

C. 4

D. -3

Answer: B



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19. From a point $P(3, 3)$ on the circle $x^2 + y^2 = 18$, two chords PQ and PR each of 2 units length are drawn on this circle. The value of $\cos (\angle QPR)$ is equal to

A. $\frac{1}{3\sqrt{2}}$

B. $-\frac{8}{9}$

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

D. $\frac{-4}{9}$

Answer: B



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20. The equation of parabola which cuts the parabola $y^2 = 4bx$ orthogonally having the same axis and length of latus rectum as $8b$, is

A. $y^2 = -8b(x - 8b)$

B. $y^2 = -8b(x - 4b)$

C. $y^2 = -8b(x - 32b)$

D. $y^2 = -8b(x - 3b)$

Answer: D



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21. If $\sum_{i=1}^5 (x_i - 6) = 5$ and $\sum_{i=1}^5 (x_i - 6)^2 = 25$,

then the standard deviation of observations



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22. If the image of the point $P(1, -2, 3)$ in the plane $2x + 3y + 4z + 22 = 0$ measured parallel to the line $20x = 5y = 4z$ is point Q, then the value of $|PQ|^2$ is



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$$23. \tan^6 20^\circ - 33 \tan^2 20^\circ + 27 \tan^2 20^\circ + 4 =$$



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$$24. \text{ If } f(x) = \begin{cases} \frac{\sqrt{1+\sqrt{5+x-a}}}{(x-4)} & 0 \leq x \leq 4 \\ b & x \geq 4 \end{cases} \text{ is}$$

continuous at $x = 4$ then value of $\frac{1}{ab}$ is equal to

A. 4

B. 15

C. 8

D. 12

Answer: D



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25. If $P_1 = 1 - \frac{w}{2} + \frac{w^2}{4} - \frac{w^3}{8} + \dots \dots \dots \infty$
and $P_2 = \frac{1 - \omega^2}{2}$ { where w is non-real root of
equation $x^3 = 1$ }, then $P_1 P_2$ is equal to



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