

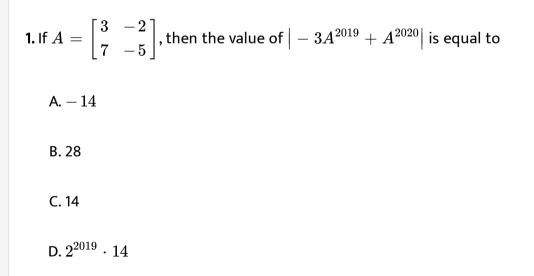


MATHS

BOOKS - NTA MOCK TESTS

NTA JEE MOCK TEST 47





Answer: A



2. Let \overrightarrow{a} be a vector in the xy - plane making an angle of 60° with the positive x - axis and $\left|\overrightarrow{a} - \hat{i}\right|$ is the geometric mean of $\left|\overrightarrow{a}\right|$ and $\left|\overrightarrow{a} - 2\hat{i}\right|$, then the value of $\left|\overrightarrow{a}\right|$ is equal to

A. $\sqrt{2}$

 $\mathsf{B}.\,\sqrt{2}+1$

 $\mathsf{C}.\,\sqrt{2}-1$

D. 2

Answer: C



3. If three normals are drawn from the point (c, 0) to the parabola $y^2 = 4x$ and two of which are perpendicular, then the value of c is equal

A. 3		
B. 4		
C. 5		
D. 6		

Answer: A

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4. If the number of ways of selecting 3 numbers out of $1, 2, 3, \ldots, 2n + 1$ such that they are in arithmetic progression is 441, then the sum of the divisors of n is equal to

A. 21

B. 32

C. 45

D. 60

Answer: B



5. If
$$\cos 5 heta = 5\cos heta - 2 heta\cos^3 heta + a\cos^5 heta + b$$
, then the value of $a+b$ is

equal to

A. 20

B. 16

C. - 16

D. 15

Answer: B



6. If
$$x = \sin(2\tan^{-1}3)$$
 and $y = \sin\left(\frac{1}{2}\tan^{-1}\left(\frac{4}{3}\right)\right)$, then

A.
$$2x=1-y$$

B. $x^2=1-2y$
C. $x^2=1+y$
D. $y^2=2x-1$

Answer: D



7. A tower subtends an angle of 60° at a point on the same level as the foot of the tower and at a second point just 10 meters above the first point the angle of depression of the foot of the tower is 15° . The height of the tower is (in meters)

A. $\frac{10}{\sqrt{3}}(2-\sqrt{3})$ B. $10\sqrt{3}(2-\sqrt{3})$ C. $\frac{10}{\sqrt{3}}(2+\sqrt{3})$ D. $10\sqrt{3}(2+\sqrt{3})$

Answer: D



8. The function
$$f \colon (-\infty,1] o \left(0,e^5
ight]$$
 defined as $f(x) = e^{x^3+2}$ is

A. Many one and onto

B. Many one and into

C. one - one and onto

D. one - one and into

Answer: B

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9. The function $f(x)=\lim_{n
ightarrow\infty} rac{\left(x-2
ight)^{2n}-1}{\left(x-2
ight)^{2n}+1}(\,orall n\in N)$ is

discontinuous at

A. x = 1 only B. x = 3 only C. x = 1 and 3 D. x = 0, 1 and 2

Answer: C

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10. If a and b are positive integers such that $N=\left(a+ib
ight)^3-107i$ (where N is a natural number), then the value of a is equal to (where $i^2=-1$)

A. 4

B. 5

C. 6

D. 9

Answer: C



11. The area (in sq. units) bounded by the curve $y=\{(x.:,x\in[0,1]),\,(2-x,:,\xi n[1,2]) ext{ with the x-axis from x=0 to x= 2 is}$

A. 2

 $\mathsf{B.}\,\frac{1}{2}$

C. 1

D. 4

Answer: C

12. Let a variable line passing through a fixed point P in the first quadrant cuts the positive coordinate axes at points A and B respectively. If the area of ΔOAB is minimum, then OP is

A. Altitude through vertex O of ΔAOB

B. Median through vertex O of ΔAOB

C. Internal angle bisector through vertex O of ΔAOB

D. None of these

Answer: B

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13. A differentiable function f(x) satisfies f(0) = 0 and $f(1) = \sin 1$, then (where f' represents derivative of f)

A.
$$f'(c)=\cos c, \ orall c\in [0,1]$$

B. $f'(c) = \cos c$ for some $\, \in \, [0,1]$

C.
$$f'(c) = -\cos c, \ orall c \in [0,1]$$

D.
$$f'(c)=2\cos c, \ orall c\in [0,1]$$

Answer: B



14. If
$$I=\int\!\!\frac{dx}{x^3(x^8+1)^{3/4}}=rac{\lambdaig(1+x^8ig)^{rac{1}{4}}}{x^2}+c$$
 (where c is the constant

of integration), then the value of λ is equal to

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

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

Answer: D

15. The order of the differential equation of the family of parabolas symmetric about y = 1 and tangent to x = 2 is

A. 2

B. 1

C. 3

D. 4

Answer: B

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16. The harmonic mean of two positive numbers a and b is 4, their arithmetic mean is A and the geometric mean is G. If $2A + G^2 = 27, a + b = \alpha$ and $|a - b| = \beta$, then the value of $\frac{\alpha}{\beta}$ is equal

to

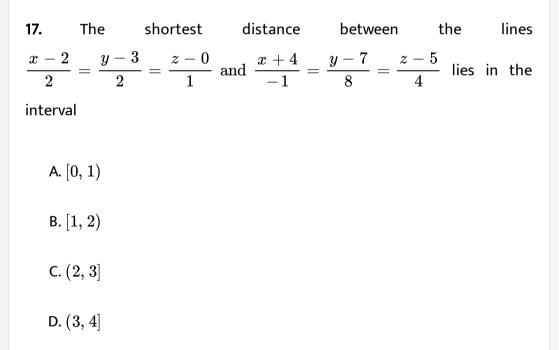
B. 3

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

D. 5

Answer: B





Answer: C



18.

$$x^{2a}y^{3b}=e^{5m}, x^{3c}y^{4d}=e^{2n}, \Delta_1=ig|egin{array}{ccc} 5m & 3b \ 2n & 4d \end{array} , \Delta_2=ig|egin{array}{ccc} 2a & 5m \ 3c & 2n \end{array} \end{bmatrix} ext{ and } \Delta_3=$$

If

, then the values of x and y are

A.
$$\frac{\Delta_1}{\Delta_3}, \frac{\Delta_2}{\Delta_3}$$

B. $\frac{\Delta_2}{\Delta_1}, \frac{\Delta_3}{\Delta_1}$
C. $\log\left(\frac{\Delta_1}{\Delta_3}\right), \log\left(\frac{\Delta_2}{\Delta_3}\right)$
D. $e^{\frac{\Delta_1}{\Delta_3}}, e^{\frac{\Delta_2}{\Delta_3}}$

Answer: D



19. For the equation $\left|x^2-2x-3
ight|=b$, which of the following statements is true?

A. For b < 0, there are no solutions

- B. For b = 0, there are three solutions
- C. For 0 < b < 4, there are two solutions
- D. For b = 4, there are four solutions

Answer: A

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20. The converse of
$$p \Rightarrow (q \Rightarrow r)$$
 is

A.
$$(q \wedge \ -r) \lor p$$

- $\mathsf{B}.\left(\mathsf{\scriptstyle{\sim}} q \lor r \right) \lor p$
- C. $(q \wedge {\,}^{\hspace{-0.5mm}} {\,}^$
- D. $(q \wedge {\scriptscriptstyle{\,{}^{\sim}}} r) \wedge p$

Answer: A

21. If 4x + 3y - 12 = 0 touches $(x - p)^2 + (y - p)^2 = p^2$, then the sum of all the possible values of p is

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22. If A and B are two events such that $P(A) = \frac{4}{7}$, $P(A \cap B) = \frac{3}{28}$ and the conditional probability $P\left(\frac{A}{A^c \cup B^c}\right)$ (where A^c denotes the compliment of the event A) is equal to λ , then the value of $\frac{26}{\lambda}$ is equal to

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23. If the number of terms free from radicals in the expansion of $\left(7^{\frac{1}{3}}+11^{\frac{1}{9}}\right)^{6561}$ is k, then the value of $\frac{k}{100}$ is equal to

24. Let $y=\sqrt{x\log_e x}$. If the value of $rac{dy}{dx}$ at $x=e^4$ is k, then the value of $4e^3k$ is (use e = 2.7)

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25. If the value of the integral $I=\int_{rac{\pi}{4}}^{rac{\pi}{3}} \max \ (\sin x, \tan x) dx$ is equal

to ln k, then the value of k^2 is equa to