



# MATHS

# **BOOKS - NTA MOCK TESTS**

# NTA JEE MOCK TEST 76

**Mathematics** 

- 1. The domain of the fuction  $f(x) = 2 \sin^{-1} \left\{ \log_2 \left( rac{1}{2} x^2 
  ight) 
  ight\}$  is
  - A.  $[\,-2,\ -1] \cup (1,2]$
  - B.  $(-2, -1] \cup [1, 2]$
  - $\mathsf{C}.\,[\,-2,\,\,-1]\cup[1,2]$
  - D.  $(-2, -1) \cup (1, 2)$

### Answer: C



**2.** Which of the following is a function whose graph is symmetrical about the origin ?

A. 
$$f(x)=\left(2^x+2^{-x}
ight)$$
  
B.  $f(x)=\left[\log\Bigl(x+\sqrt{1+x^2}\Bigr)
ight]^2$   
C.  $f(x+y)=f(x)+f(y)$   $orall x,y\in R$ 

D. None of these

#### Answer: C

Watch Video Solution

**3.** Let the function  $f(x) = x^2 \sin\left(rac{1}{x}
ight), \, orall x 
eq 0$  is continuous at x = 0.

Then, the vaue of the function at x = 0 is

 $\mathsf{B.}-1$ 

C. 1

D. indeterminate

Answer: A

Watch Video Solution

**4.** All the students of a class performed poorly in Mathematics. The teacher decided to give grace marks of 12 to the entire class. Which of the following statistical measures will not change even after the grace marks were given?

A. Median

B. Mode

C. Variance

D. Mean

### Answer: C

### Watch Video Solution

5. If p,q and r are simple propositions with truth values T,F and T , respectively, then the truth value of (  ${}^{-}p \lor q$ )  $\wedge$   ${}^{-}r o p$  is

A. True if the truth values of p, q, r are T,F,T respectively

B. False if the truth values of p, q, r are T,F,T respectively

C. False if the truth values of p, q, r are T,F,F respectively

D. True if the truth values of p, q, r are F,T,F respectively

#### Answer: A



6. A bag contains 5 white balls, 3 black balls, 4 yellow balls. A ball is drawn

from the bag, its colour is noted and put back into the bag with 5

additional balls of the same colour. The process is repeated. The probability that a yellow ball is drawn in the  $1^{st}$  draw given that a white ball is drawn in the  $2^{nd}$  draw is

A. 
$$\frac{9}{55}$$
  
B.  $\frac{4}{17}$   
C.  $\frac{1}{5}$   
D.  $\frac{2}{11}$ 

#### Answer: B

## > Watch Video Solution

7. Let  $P(1, 7, \sqrt{2})$  be a point and the equation of the line L is  $\frac{x-1}{\sqrt{2}} = \frac{y-7}{1} = \frac{z-\sqrt{2}}{-1}$ . If PQ is the distnace of the plane  $\sqrt{2}x + y - z = 1$  from the point P measured along a line inclined at an angle 60° with L, then the length of PQ is

A. 3 units

B.  $3\sqrt{2}$  units

C. 6 units

D. 8 units

### Answer: C

**Vatch Video Solution** 

8. Let 
$$x = \begin{bmatrix} 2 & 1 \\ 0 & 3 \end{bmatrix}$$
 be a matrix. If  $X^6 = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ , then the number of divisors of  $(a + b + 2020c + d)$  is equal to

A. 7

B. 14

C. 21

D. 28

Answer: B

Watch Video Solution

9. Let 
$$A=egin{bmatrix} x&2&-3\\ -1&3&-2\\ 2&-1&1 \end{bmatrix}$$
 be a matrix and  $|adj(adjA)|=(12)^4$ , then

the sum of all the values of x is equal to

A. - 24

B. 24

C. - 18

D. 1

Answer: C

Watch Video Solution

**10.** Let the coordinates of two points P and Q be (1, 2) and (7, 5) respectively. The line PQ is rotated thorugh  $315^{\circ}$  is clockwise direction about the point of trisection of PQ which is nearer to Q. The equation of the line in the new position is

A. 
$$2x - y - 6 = 0$$
  
B.  $x - y - 1 = 0$   
C.  $3x - y - 11 = 0$ 

### D. 3x - y - 9 = 0

#### Answer: C

Watch Video Solution

11. If the circles  $(x-3)^2 + (y-4)^4 = 16$  and  $(x-7)^2 + y-7\Big)^2 = 9$ intersect at points A and B, then the area (in sq. units) of the quadrilateral  $C_1AC_2B$  is equal to (where,  $C_1$  and  $C_2$  are centres of the given circles)

A. 6

B. 12

C. 18

D. 24

### Answer: B

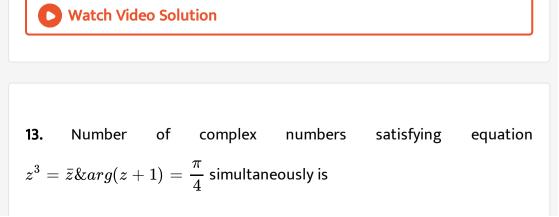


12. If the eccentricity of the hyperbola  $x^2-y^2\sec^2lpha=5$  is  $\sqrt{3}$  times the eccentricity of the ellipse  $x^2\sec^2lpha+y^2=25$ , then  $\tan^2lpha$  is equal to

B. 1 C. 3 D.  $\frac{1}{2}$ 

A. 2

#### Answer: B



A. i

B.1 + 2i

C.2 + 3i

 $\mathsf{D.}\,3+4i$ 

Answer: A

Watch Video Solution

14. The coefficient of  $x^6$  in  $\left\{ (1+x)^6 + (1+x)^7 + ..... + (1+x)^{15} 
ight\}$ 

is

A.  $.^{16} C_9$ 

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

 ${\sf C.\,.}^{16} \, C_6 - 1$ 

 ${\sf D.\,.}^{16}\,C_6$ 

#### Answer: A

**15.** The position vector of a point P is  $\overrightarrow{r} = x\hat{i} + y\hat{j} + z\hat{k}$  where  $x, y, z \in N$  and  $\overrightarrow{a} = \hat{i} + \hat{j} + \hat{k}$ . If  $\overrightarrow{r} \cdot \overrightarrow{a} = 10$ , then the number of possible position of P is

A. 36

B.72

C. 66

D. 54

### Answer: A

Watch Video Solution

16. If the equation  $2x^2-7x+9=0$  and  $ax^2+bx+18=0$  have a common root, then  $(a,b\in R)$ 

A. a = 2, b = -7B.  $a = \frac{-7}{2}, b = 1$ C. a = 4, b = -14D. a = 4, b = -7

### Answer: C

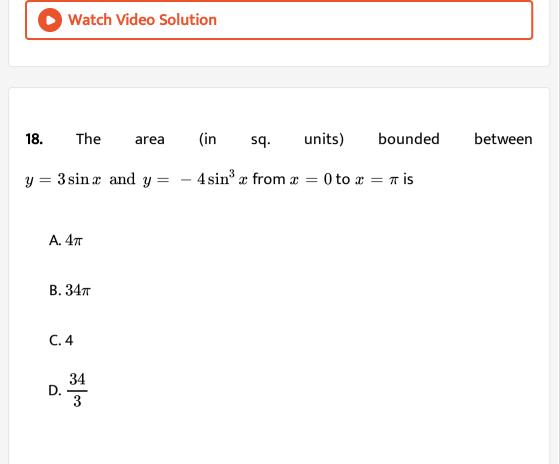
**Watch Video Solution** 

17. Consider the integral 
$$I_n=\int_0^{rac{n}{4}}rac{\sin(2n-1)x}{\sin x}dx$$
, then the value of

 $I_{20}-I_{19}$  is

A. 
$$\frac{1}{20}$$
  
B.  $\frac{-1}{19}$   
C.  $\frac{-1}{25}$   
D.  $\frac{1}{19}$ 

Answer: B



#### Answer: D

Watch Video Solution

19. If f(x) is a differentiable function satisfying  $|f'(x)| \leq 2 \, orall \, x \in [0,4]$  and f(0)=0, then

A. f(x)=18 has no solution in  $x\in[0,4]$ 

B. f(x)=18 has more than 2 solutions in  $x\in[0,4]$ 

C. f(x)=14 has 3 solutions in  $x\in[0,4]$ 

D. f(x)=20 has 2 solutions in  $x\in[0,4]$ 

#### Answer: A

**Watch Video Solution** 

20. The equation of the curve satisfying the differential equation  $\frac{dy}{dx} + \frac{y}{x^2} = \frac{1}{x^2} \text{ and passing through } \left(\frac{1}{2}, e^2 + 1\right) \text{ is}$ A.  $y = e^x + 1$ B.  $y = e^{\frac{1}{x}} - 1$ C.  $y = 1 + e^{\frac{1}{x}}$ 

#### Answer: C

D.  $y = 1 + e^{-x}$ 

Watch Video Solution

**21.** If from the top of a tower, 60 meters high, the angles of depression of the top an floor of a house are  $3^{\circ}$  and  $60^{\circ}$  respectively, then the height (in meters) of the house is

Watch Video Solution

**22.** Let  $\overrightarrow{p}, \overrightarrow{q}, \overrightarrow{r}, \overrightarrow{s}$  are non - zero vectors in which no two of them are perpendicular and no three of them are coplanar. If  $(\overrightarrow{p} \times \overrightarrow{r}).(\overrightarrow{p} \times \overrightarrow{s}) + (\overrightarrow{r} \times \overrightarrow{p}).(\overrightarrow{q} \times \overrightarrow{s}) = k [(\overrightarrow{p} \times \overrightarrow{q}).(\overrightarrow{s} \times \overrightarrow{r}), (\overrightarrow{p} \times \overrightarrow{s})] + (\overrightarrow{r} \times \overrightarrow{p}).(\overrightarrow{q} \times \overrightarrow{s}) = k [(\overrightarrow{p} \times \overrightarrow{q}).(\overrightarrow{s} \times \overrightarrow{r})]$ , then the value of  $\frac{k}{2}$  is equal to

### Watch Video Solution

**23.** A point P on the parabola  $y^2 = 4x$ , the foot of the perpendicular from it upon the directrix and the focus are the vertices of an equilateral triangle. If the area of the equilateral triangle is  $\beta$  sq. units, then the value of  $\beta^2$  is **24.** Let the sets  $A = \{2, 4, 6, 8...\}$  and  $B = \{3, 6, 9, 12...\}$  such that n(A) = 200 and n(B) = 250. If  $n(A \cup B) = k$ , then  $\frac{k}{100}$  is equal to

Watch Video Solution

**25.** The area (in sq. units) bounded by the curve  $e^xy-2=0$  with the x -

axis from x = 0 to  $x = \ln 2$  is

Watch Video Solution