



# MATHS

# **BOOKS - NTA MOCK TESTS**

# NTA JEE MOCK TEST 75

# Mathematics

1. Let P is a point on the line y + 2x = 2 and Q and R are two points on the line 3y + 6x = 3. If the triangle PQR is an equilateral triangle, then its area (in sq. units) is equal to

A. 
$$\frac{1}{15}$$
  
B.  $\frac{1}{5\sqrt{3}}$   
C.  $\frac{1}{3\sqrt{5}}$   
D.  $\frac{1}{2\sqrt{15}}$ 

Answer: B

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2. Let O be an interior point of triangle ABC, such that  $\overrightarrow{2OA} + \overrightarrow{3OB} + \overrightarrow{4OC} = 0$ , then the ratio of the area of  $\Delta ABC$  to the area of  $\Delta AOC$  is B. 3:2

C.2:1

D. 4:3

Answer: A

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**3.** Let  $\alpha, \beta, \gamma$  be three real numbers satisfying  $\begin{bmatrix} \alpha & \beta & \gamma \end{bmatrix} \begin{bmatrix} 2 & -1 & 1 \\ -1 & -1 & -2 \\ -1 & 2 & 1 \end{bmatrix} = \begin{bmatrix} 0 & 0 & 0 \end{bmatrix}$ . If the point  $A(\alpha, \beta, \gamma)$  lies on the plane 2x + y + 3z = 2, then  $3\alpha + 3\beta - 6\gamma$  is equal to

$$\mathsf{B.}-\frac{1}{3}$$

C. 1

 $\mathsf{D.}-3$ 

Answer: A

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4. If the tangent to the ellipse  $x^2 + 4y^2 = 16$  at the point 0 sanormal to the circle  $x^2 + y^2 - 8x - 4y = 0$  then  $\theta$  is equal to

A. 
$$\frac{\pi}{2}$$
  
B.  $\frac{\pi}{4}$ 

C. 
$$\frac{5\pi}{2}$$
  
D.  $\frac{7\pi}{4}$ 

Answer: A

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5. The solution of the differential equation  $(3\sin^2 x \cos x)y^2 dx + 2y\sin^3 x dy = \sin x dx$  (where, C is an arbitrary constant)

A.  $2y^2 \sin x = \cos x + C$ 

 $\mathsf{B}.\,y^2\sin^3x + \cos x = C$ 

 $\mathsf{C}.\,y^3\sin^2x+\sin x=C$ 

$$\mathsf{D}.\,y\sin x = \cos^2 x + C$$

### **Answer: B**



**6.** The smallest positive integral value of a, such that the function  $f(x) = x^4 - 4ax^2 + 10$  has more two local extrema, is

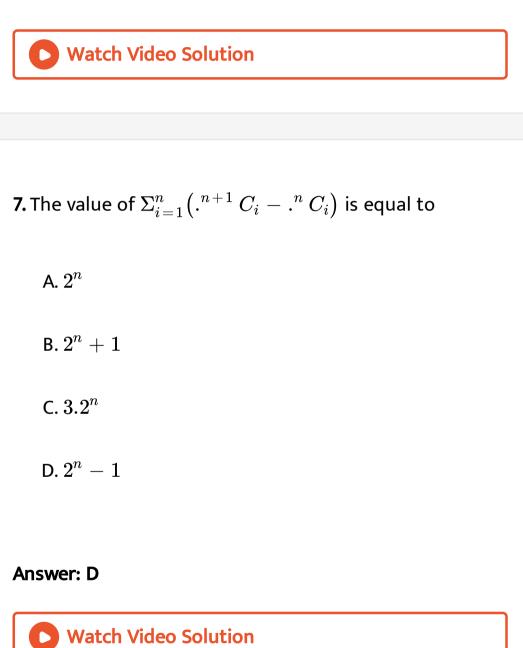
A. 1

B. 2

C. 4

D. 16

## Answer: A



8. If the integral 
$$\int_0^2 \frac{dx}{\sin x + \sin(2-x)} = A$$
, then the integral  $\beta = \int_0^2 \frac{xdx}{\sin x + \sin(2-x)}$  is equal to

A.  $(\sin 2)A$ 

B. 2A

C. A

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

## Answer: C



**9.** If the reciprocals of 2,  $\log_{(3^x-4)} 4$  and  $\log_{3^x+\frac{7}{2}} 4$  are

in arithmetic progression, then x is equal to

A. 1

B. 2

C. 4

D. 0

Answer: B

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**10.** From point P(4,0) tangents PA and PB are drawn to the circle  $S: x^2 + y^2 = 4$ . If point Q lies on the circle, then maximum area of  $\triangle QAB$  is- (1)  $2\sqrt{3}$  (2)  $3\sqrt{3}$  (3)  $4\sqrt{3}$  A) 9 A. 12

B. 27

C. 48

D. 45

Answer: B

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11. Consider a plane P: 2x + y - z = 5, a line  $L: \frac{x-3}{2} = \frac{y+1}{-3} = \frac{z-2}{-1}$  and a point A(3, -4, 1). If the line L intersects plane P at B and the xy plane at C, then the area (in sq. units) of  $\Delta ABC$  is A.  $\sqrt{7}$ 

B.  $\sqrt{8}$ 

C.  $\sqrt{10}$ 

D.  $2\sqrt{3}$ 

Answer: C

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12. The number of triplets (a, b, c) of positive integers

	$a^3+1$	$a^2b$	$a^2c$	
satisfying the equation	$ab^2$	$b^3+1$	$b^2c$	= 30
	$ac^2$	$bc^2$	$c^3+1$	

is equal to

B. 6

C. 9

D. 12

Answer: A

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13. The locus of the trisection point of any arbitrary double ordinate of the parabola  $x^2 = 4y$ , is

A. 
$$9x^2=y$$
  
B.  $3x^2=2y$   
C.  $9x^2=4y$ 

D. 
$$9x^2 = 2y$$

### Answer: C

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# 14. If $A = \{1, 3, 5, 7, 9, 11, 13, 15\}, B \text{ and } N = \{2, 4, \dots, 16\}$ is the universal set, then $A' \cup ((A \cup B) \cap B')$ is (where, N is the set of natural numbers)

A. A

B. N

С. В

# D. None of these

### Answer: B

15. Let 
$$f\colon (6,8) o (9,11)$$
 be a function defined as  $f(x)=x+\left[rac{x}{2}
ight]$  (where  $[.]$  denotes the greatest integer function), then  $f^{-1}(x)$  is equal to

A. 
$$x - \left[rac{x}{2}
ight]$$
  
B.  $-x - 3$   
C.  $x - 3$   
D.  $rac{1}{x + \left[rac{x}{2}
ight]}$ 

# Answer: C



16. Let f(x+y)=f(x). f(y) for all  $x,y\in R$  and  $f(x)=1+x\phi(x)\log 3.$  If  $\lim_{x
ightarrow 0}\phi(x)=1,$  then f'(x) is equal to

A.  $\log 3^{f(x)}$ 

 $\mathsf{B.}\log[f(x)]^3$ 

 $C.\log 3$ 

D. None of these

### Answer: A





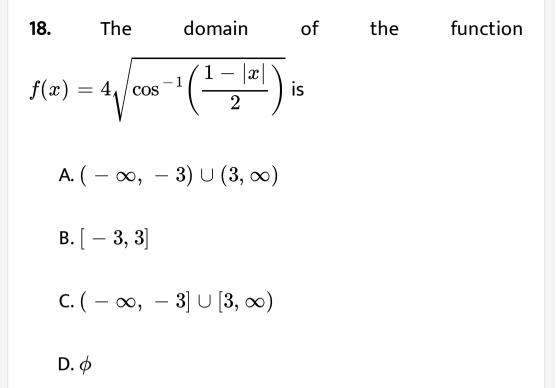
**17.** If the standard deviation of the numbers 2, 4, a and 10 is 3.5, then which of the following is true?

A. 
$$3a^2 - 23a + 24 = 0$$
  
B.  $3a^2 - 26a + 46 = 0$ 

C. 
$$3a^2 - 32a + 28 = 0$$

D. 
$$3a^2 - 34a + 45 = 0$$

## Answer: C



#### **Answer: B**



**19.** A word has 4 identical letters and rest all are distinct letters. If the total number of words that can be made with the letters of the word be 210, then the total number of different letters in the word is equal to

A. 3

B. 5

C. 4

D. 7

Answer: C

**20.** The integral  $I = \int \sec^3 x \tan^3 x dx$  is equal to (where,

C is the constant of integration)

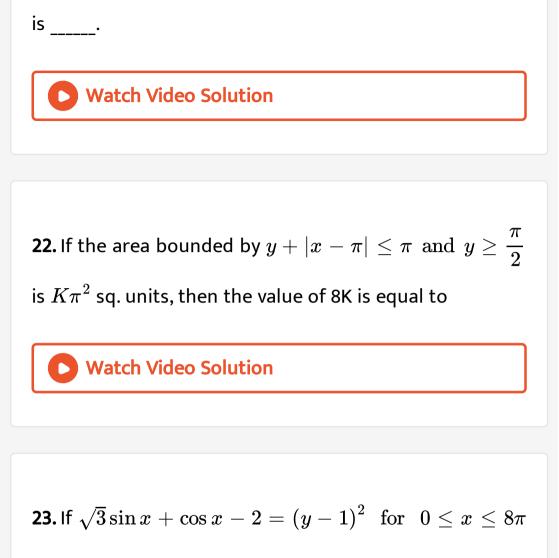
A. 
$$\sec^5 x - \sec^3 x + C$$

B. 
$$rac{\sec^5 x}{5} - \sec^3 x + C$$
  
C.  $rac{\sec^5 x}{5} - rac{\sec^3 x}{3} + C$   
D.  $rac{\sec^5 x}{5} - \tan^{-1} x + C$ 

### Answer: C



**21.** If  $\omega$  is the imaginary cube roots of unity, then the number of pair of integers (a,b) such that  $|a\omega + b| = 1$ 



, then the number of values of the pair (x, y) is equal to

**24.** The probability that a married man watches a certain T.V. show is 0.6 and the probability that a married woman watches the show is 0.5. The probability that a man watches the show given that his wife does watch is 0.8. If the probability that a wife watches the show given that her husband does watch is k, then  $\frac{1}{k}$  is equal to

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25. The value of 
$$\lim_{x o 1} \Sigma_{r=1}^{10} = rac{x^r-1^r}{2(x-1)}$$
 is equal to