



# MATHS

# **BOOKS - NTA MOCK TESTS**

# NTA JEE MOCK TEST 79

## Mathematics

1. Three balls are marked with 2, 4 and 6. They are placed in a box and a ball is drawn, its number is noted and the ball drawn is returned to the box. The process is repeated two more times. If the probability to the sum of all three numbers is 12 is  $\lambda$ , then  $108\lambda$  is equal to A. 28

B. 14

C. 20

D. 10

Answer: A

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2. The number of 2 imes 2 matrices A with real entries, such that  $A + A^T = 3I$  and  $AA^T = 5I$ , is equal to

A. 0

B. 1

C. 2

D. infinite

#### Answer: C

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**3.** The sum of the intercepts of the plane on the coordinate axes, passing through the intersection of the planes 2x + 3y + 3z - 5 = 0 and 2x - 5y + 3z + 1 = 0 and parallel to the line  $\frac{x-1}{2} = \frac{y-2}{-5} = \frac{z-3}{-7}$ , is

A. 
$$\frac{2}{5}$$
  
B.  $\frac{11}{105}$   
C.  $\frac{11}{102}$   
D.  $\frac{3}{101}$ 



4. If 
$$A_r = \begin{bmatrix} \frac{1}{r(r+1)} & \frac{1}{3^r} \\ 2 & 3 \end{bmatrix}$$
, then  $\lim_{n \to \infty} \Sigma_{r=1}^n |A_r|$  is equal to  
A. 0  
B. 2  
C. 4  
D. 8



5. The solution of the equation  $\cos^{-1}x + \cos^{-1}2x = \frac{2\pi}{3}$ 

is

A. 
$$x=\pmrac{\sqrt{3}}{\sqrt{28}}$$
  
B.  $x=\pmrac{\sqrt{3}}{\sqrt{26}}$   
C.  $x=\pmrac{1}{\sqrt{2}}$   
D.  $x=\pmrac{\sqrt{3}}{\sqrt{38}}$ 

#### Answer: A



6. Negation of "Monu is in class X or Anu is in class XII" is

A. Monu is not in class X and Anu is in class XII

B. Monu is not in class X and Anu is not in class XII

C. Either Monu is not in class X or Anu is not in class XII

D. None of these

#### Answer: B

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7. The value of  $\lim_{x o 0} \left(\cos x + \sin bx 
ight)^{rac{a}{x}}$  is equal to

A.  $e^{-ab}$ 

 $\mathsf{B.}\,e^{ab^2}$ 

 $\mathsf{C}.\,e^{ab}$ 

D.  $e^{\,-\,b^2a}$ 



**8.** If  $f(x) = [x] an(\pi x)$  then  $f'(k^+)$  is equal to (where k is

some integer and [.] denotes greatest integer function)

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9. Consider the integrals 
$$I = \int \frac{\sin x}{3\cos x + 4\sin x} dx$$
 and  $J = \int \frac{\cos x}{3\cos x + 4\sin x} dx$ .  
Then, the integral  $4J - 3J$  is equal to (where, c is the constant of integration)

A.  $\ln |2\cos x - 4\sin x| + c$ 

 $\mathsf{B}.\ln|3\cos x + 4\sin x| + c$ 

 $\mathsf{C}.\ln|3\sin x + 4\cos x| + c$ 

 $\mathsf{D}.\ln|3\sin x - 4\cos x| + c$ 

#### Answer: B

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10. If the area bounded by  $f(x) = \tan^3 x + \tan x$  from x = 0 to  $x = \frac{\pi}{4}$  is k square units, then the maximum value of  $g(x) = k \sin x$  is  $\left( \forall x \in \left[0, \frac{\pi}{4}\right] \right)$ 

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

C. 4

#### Answer: B

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11. For the function 
$$f(x)=\sin^3x-3\sin x+4 \,orall x\in \left[0,rac{\pi}{2}
ight]$$
, which of the

following is true?

A. Greatest value of the function is  $2\pi$ 

B. Greatest value of the function is 4

C. Rolle's Theorem is applicable to f(x) in  $x \in \left[0, \frac{\pi}{2}\right]$ D. LMVT is not applicable to f(x) in  $x \in \left[0, \frac{\pi}{2}\right]$ 



12. The curve satisfying the differential equation  $\sin(x^3)e^ydy + 3x^2\cos(x^3)e^ydx = x\sin(x^2)dx$  C is the constant of integration is  $\lambda\sin(x^3)e^y + \cos(x^2) = C$ . Then, the value of  $\lambda$  is

A. 1

B. 2

C. 3

D. 4



**13.** A possible three digit even number which can be formed with the condition that If 5 is one of the digit, then 7 is next digit is :

A. 5

B. 325

C. 345

D. 265

#### Answer: D

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14. The discriminant of the quadratic $(2x+1)^2 + (3x+2)^2 + (4x+3)^2 + \dots n$  terms

 $x=0,\,orall n>3,x\in R$  is

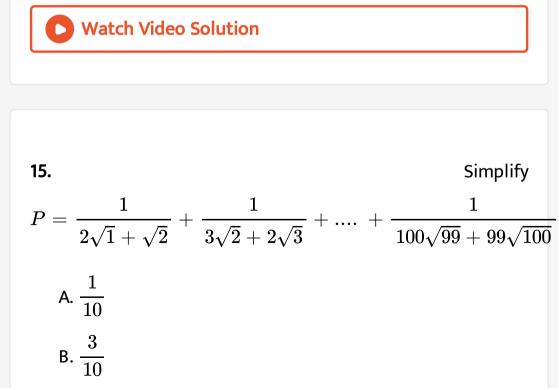
A. positive

B. zero

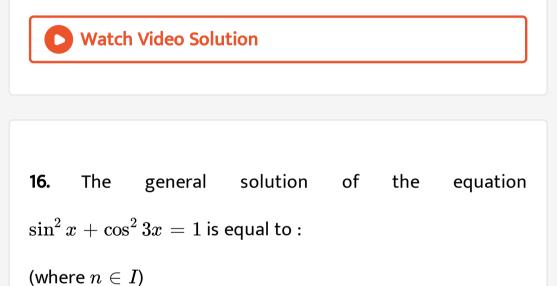
C. negative

D. depends on n

#### Answer: C



C. 
$$\frac{9}{10}$$
  
D.  $\frac{1}{2}$ 



A. 
$$x=rac{n\pi}{3}$$
  
B.  $x=n\pi+rac{\pi}{4}$   
C.  $x=rac{n\pi}{4}$   
D.  $x=n\pi+rac{\pi}{2}$ 

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17. The line  $L_1: \frac{x}{5} + \frac{y}{b} = 1$  passes through the point (13, 32) and is parallel to  $L_2: \frac{x}{c} + \frac{y}{3} = 1$ . Then, the distance between  $L_1$  and  $L_2$  is

A. 
$$\frac{17}{\sqrt{15}}$$
 units  
B.  $\frac{23}{\sqrt{17}}$  units  
C.  $\frac{23}{\sqrt{17}}$  units  
D.  $\frac{23}{\sqrt{15}}$  units

#### Answer: C

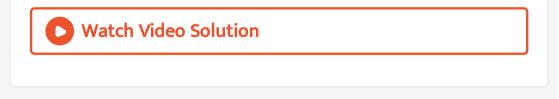
**18.** B&C are fixed points having co-ordinates (3, 0) and (-3, 0) respectively. If the vertical angle BAC is  $90^{\circ}$ , then the locus of the centroid of the triangle ABC has the equation :

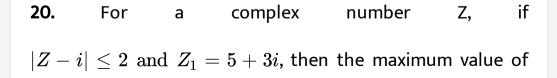
A. 
$$x^2 + y^2 = 1$$
  
B.  $x^2 + y^2 = 2$   
C.  $9(x^2 + y^2) = 1$   
D.  $9(x^2 + y^2) = 4$ 

#### Answer: A

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19. The product of the slopes of the common tangents of the ellipse  $x^2 + 4y^2 = 16$  and the parabola  $y^2 - 4x - 4 = 0$  is A.  $-\frac{1}{15}$ B.  $\frac{1}{16}$ C.  $-\frac{1}{3}$ D.  $-\frac{1}{2}$ 





 $ert i Z + Z_1 ert$  is (where,  $i^2 = ert - 1$ )

A.  $7+\sqrt{13}$ 

 $\mathrm{B.}\,7+\sqrt{12}$ 

C. 7

D.  $\sqrt{34}-2$ 

#### Answer: C



**21.** Consider a parabola  $y^2 = 4x$  with vertex at A and focus at S. PQ is a chord of the parabola which is normal at point P. If the abscissa and the ordinate of the point P are equal, then the square of the length of the diameter of the circumcircle of triangle PSQ is



22. if 
$$\sum rac{k}{k+1} \cdot {}^{100}C_k = rac{a \cdot 2^{100} + b}{c}$$
 where  $a,b,c \in N$ 

then find the least value of a+b+c

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23. The value of the integral 
$$I=\int_{0}^{rac{\pi}{2}}rac{\sin^{3}x-\cos^{3}x}{1+\sin^{6}x\cos^{6}x}dx$$
 is

equal to



**24.** If 
$$\sqrt{x+y} + \sqrt{y-x} = 2$$
, then the value of  $rac{d^2y}{dx^2}$  is

### equal to



**25.** Let 
$$\overrightarrow{a}$$
 and  $\overrightarrow{b}$  are vectors such that  $\left|\overrightarrow{a}\right| = 2$ ,  $\left|\overrightarrow{b}\right| = 3$  and  $\overrightarrow{a}$ .  $\overrightarrow{b} = 4$ . If  $\overrightarrow{c} = \left(3\overrightarrow{a} \times \overrightarrow{b}\right) - 4\overrightarrow{b}$ , then  $\left|\overrightarrow{c}\right|$  is equal to

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