



## MATHS

### BOOKS - NTA MOCK TESTS

#### NTA JEE MOCK TEST 41

#### Mathematics

1. If  $f(x) = (x - 1)(x - 2)(x - 3)(x - 4)(x - 5)$ ,

then the value of  $f'(5)$  is equal to

A. 0

B. 120

C. 24

D. 5

**Answer: C**



**Watch Video Solution**

2. If  $p$ ,  $q$  and  $r$  are 3 statements, then the truth value of  $((\neg p \vee q) \wedge r) \Rightarrow p$  is

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

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

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

D. False if truth values of  $p$ ,  $q$ ,  $r$  are T, T, T  
respectively

**Answer: A**



**Watch Video Solution**

3. The number of nonnegative integer solutions of the equation  $x + y + z + 5t = 15$  is

A. 196

B. 224

C. 312

D. 364

**Answer: B**



**Watch Video Solution**

4. Let  $f(x) = \frac{1}{x^2} : |x| \geq 1$  . If  $f(x)$  is  
 $\alpha x^2 + \beta : |x| < 1$

continuous and differentiable at any point, then

A.  $\alpha = 2, \beta = 1$

B.  $\alpha = -1, \beta = 2$

C.  $\alpha = 1, \beta = 0$

D.  $\alpha = -2, \beta = 3$

**Answer: B**



**Watch Video Solution**

5. If  $\alpha, \beta$  are the roots of the equation  $8x^2 - 3x + 27 = 0$ , then the value of

$$\left(\frac{\alpha^2}{\beta}\right)^{\frac{1}{3}} + \left(\frac{\beta^2}{\alpha}\right)^{\frac{1}{3}} \text{ is}$$

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

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

C.  $\frac{1}{5}$

D.  $\frac{1}{6}$

**Answer: B**



**Watch Video Solution**

6.  $\left(1\frac{2}{3}\right)^2 + \left(2\frac{1}{3}\right)^2 + 3^2 + \left(3\frac{2}{3}\right)^2 + \dots$  to 10

terms, the sum is :

A.  $\frac{1390}{9}$

B.  $\frac{1790}{9}$

C.  $\frac{1990}{9}$

D.  $\frac{2290}{9}$

**Answer: D**



**Watch Video Solution**

7. For a complex number  $Z$ , if all the roots of the equation  $Z^3 + aZ^2 + bZ + c = 0$  are unimodular, then

A.  $|a| > 3$  and  $|c| = 1$

B.  $|a| \leq 3$  and  $|c| = 3$

C.  $|a| > 3$  and  $|c| = \frac{1}{3}$

D.  $|a| \leq 3$  &  $|c| = 1$

**Answer: D**



**Watch Video Solution**



8. If  $A, B, C, D$  are four distinct points in space such that  $AB$  is not perpendicular to  $CD$  and satisfies

$$\vec{AB} \cdot \vec{CD} = k \left( |\vec{AD}|^2 + |\vec{BC}|^2 - |\vec{AC}|^2 - |\vec{BD}|^2 \right),$$

then find the value of  $k$ .

A.  $1/2$

B. 1

C.  $3/2$

D. 2

**Answer: A**



**Watch Video Solution**

9. Let a random variable  $X$  have a binomial distribution with mean 8 and variance  $r$ . If

$$P(X \leq 2) = \frac{k}{2^{16}}, \text{ then } k \text{ is equal to}$$

A. 121

B. 1

C. 17

D. 137

**Answer: D**



**Watch Video Solution**

10. A tangent drawn to the hyperbola  $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$  at  $P\left(a \sec \frac{\pi}{6}, b \frac{\tan \pi}{6}\right)$  form a triangle of area  $3a^2$  sq. units with the coordinate axes. The eccentricity of the conjugate hyperbola of  $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$  is

A.  $\sqrt{17}$

B.  $\frac{\sqrt{17}}{4}$

C.  $\frac{\sqrt{17}}{2}$

D.  $\frac{8}{\sqrt{17}}$

**Answer: B**



**Watch Video Solution**

11. If  $f(x) = \tan^{-1}\left(\frac{2^x}{1 + 2^{2x+1}}\right)$ , then  $\sum_{r=0}^9 f^r$  is

A.  $\tan^{-1}(1024)$

B.  $\tan^{-1}\left(\frac{1023}{1024}\right)$

C.  $\tan^{-1}\left(\frac{1023}{1025}\right)$

D. None of these

**Answer: C**



**Watch Video Solution**

12. Let  $A_n = \int \tan^n x dx, \forall n \in N.$  If

$A_{10} + A_{12} = \frac{\tan^m x}{m} + \lambda$  (where  $\lambda$  is an arbitrary constant), then the value of  $m$  is equal to

A. 10

B. 11

C. 12

D. 13

**Answer: B**



**Watch Video Solution**

13. Let  $f(x) = \sin^3 x - 3 \sin x + 6, \forall x \in (0, \pi)$ . The number of local maximum/maxima of the function  $f(x)$  is

A. 0

B. 1

C. 2

D. 3

**Answer: A**



**Watch Video Solution**

14. The angle between the chords of the circle  $x^2 + y^2 = 100$ , which passes through the point (7,1) and also divides the circumference of the circle into two arcs whose length are in the ratio 2 : 1, is equal to

- A.  $\frac{\pi}{6}$
- B.  $\frac{\pi}{3}$
- C.  $\frac{\pi}{2}$
- D.  $\frac{2\pi}{3}$

**Answer: C**



**Watch Video Solution**

15. If  $\alpha$  and  $\beta$  are the roots of the equation,

$$[1, 5] \left[ \begin{array}{cc} 1 & 3 \\ -4 & 7 \end{array} \right]^2 \left[ \begin{array}{cc} \frac{7}{19} & -\frac{13}{19} \\ \frac{4}{19} & \frac{1}{19} \end{array} \right]^4$$
$$\left[ \begin{array}{cc} 1 & 3 \\ -4 & 7 \end{array} \right]^2 \left[ \begin{array}{c} x^2 - 5x + 5 \\ -3 \end{array} \right] = [-4], \text{ then the value}$$

of  $(2 - \alpha)(2 - \beta)$  is

- A. 51
- B.  $-12$
- C. 12
- D.  $-7$

**Answer: B**





**16.** If the equal sides  $AB$  and  $AC$  (each equal to 5 units) of a right-angled isosceles triangle  $ABC$  are produced to  $P$  and  $Q$  such that  $BP \cdot CQ = AB^2$ , then the line  $PQ$  always passes through the fixed point (where  $A$  is the origin and  $AB, AC$  lie along the positive  $x$  and positive  $y$  - axis respectively)

A. (7, 6)

B. (6, 5)

C. (5, 5)

D. (6, 6)

**Answer: C**



**Watch Video Solution**

17. If  $\frac{2 \sin \alpha}{1 + \cos \alpha + \sin \alpha} = \frac{3}{4}$ , then the value of  $\frac{1 + \cos \alpha + \sin \alpha}{1 + \sin \alpha}$  is equal to

A.  $4/3$

B.  $3/4$

C.  $1/4$

D.  $\frac{7}{4}$

**Answer: B**

18. The intercepts made on the x, y and z axes, by the plane which bisects the line joining the points  $(1,2,3)$  and  $(-3, 4,5)$  at right angles, are a,b and c respectively, then the ordered triplet  $(a,b,c)$  is

A.  $\left(\frac{-9}{2}, 9, 9\right)$

B.  $\left(\frac{9}{2}, 9, 9\right)$

C.  $\left(9, \frac{-9}{2}, 9\right)$

D.  $\left(9, \frac{9}{2}, 9\right)$

**Answer: A**



Watch Video Solution

19. The value of  $\lim_{x \rightarrow \frac{\pi}{4}} (\sin 2x)^{\sec^2 x}$  is equal to

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

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

C.  $e^{-1/2}$

D.  $e^{1/2}$

**Answer: C**



Watch Video Solution

20. If  $a, b$  and  $c$  are distinct positive real numbers

such that  $\Delta_1 = \begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix}$  and

$$\Delta_2 = \begin{vmatrix} bc - a^2 & ac - b^2 & ab - c^2 \\ ac - b^2 & ab - c^2 & bc - a^2 \\ ab - c^2 & bc - a^2 & ac - b^2 \end{vmatrix}, \text{ then}$$

A.  $\Delta_1 = \Delta_2$

B.  $\Delta_1^2 + \Delta_2 = 0$

C.  $\Delta_1^2 = \Delta_2$

D.  $\Delta_1^2 = \Delta_2^2$

**Answer: C**



**Watch Video Solution**

21. If  $\lim_{x \rightarrow 0} \frac{x(1 + a \cos x) - b \sin x}{x^3} = 1$ , then the value of  $ab$  is equal to



Watch Video Solution

22. If the solution of the differential equation  $x^2 dy + 2xy dx = \sin x dx$  is  $x^k y + \cos x = C$  (where  $C$  is an arbitrary constant), then the value of  $k$  is equal to

A. 0

B. 1

C. 2

D. 3

**Answer: C**



**Watch Video Solution**

**23.** If the normals at two points P and Q of a parabola  $y^2 = 4x$  intersect at a third point R on the parabola  $y^2 = 4x$ , then the product of the ordinates of P and Q is equal to



**Watch Video Solution**

24. The coefficient of  $t^{50}$  in  $(1 + t)^{41} (1 - t + t^2)^{40}$  is equal to

 [Watch Video Solution](#)

25. Let  $f: R \rightarrow R$  is a function defined as  $f(x)$

$$\text{where } = \begin{cases} |x - [x]| & : [x] \text{ is odd} \\ |x - [x + 1]| & : [x] \text{ is even} \end{cases}$$

$[.]$  denotes the greatest integer function, then

$$\int_{-2}^4 dx \text{ is equal to}$$

 [Watch Video Solution](#)