



Nishant eAcademy

CBSE Sample Paper Class 12 Mathematics 2022-23

Subject: Mathematics Class: 12 Maximum Marks: 100 Duration: 3 hours

Section A: Objective Type (20 marks)

1. Multiple Choice Questions: a) The derivative of $\sin x$ with respect to x is: (A) $\cos x$ (B) $-\sin x$ (C) $\csc x$ (D) $\sec x$
b) The value of $\int_0^1 (3x^2 - 2x + 1)dx$ is: (A) 1 (B) 2 (C) 3 (D) 4
2. Fill in the blanks: a) The value of $\lim_{x \rightarrow 0} \frac{\sin x}{x}$ is _____. b) The probability of an event always lies between _____.

Section B: Short Answer Type (40 marks)

3. Prove that $\cos^2\theta + \sin^2\theta = 1$.
4. Find the equation of the tangent to the curve $y = 2x^3 - 3x^2 + 4x - 1$ at the point (1, 2).
5. Solve the differential equation $\frac{dy}{dx} = 2x$ given that $y = 3$ when $x = 1$.
6. Find the value of $\tan^{-1}\left(\frac{1}{\sqrt{3}}\right)$.

Section C: Long Answer Type (40 marks)

7. Find the maximum and minimum values of the function $f(x) = x^3 - 3x^2 + 4$ in the interval $[-1, 2]$.
8. Solve the system of equations:
 $2x + y = 5$
 $3x - 2y = 4$
9. Find the value of $\int_0^x \sin^2 x \, dx$.
10. A man is 2 meters tall and his shadow is 3 meters long. At the same time, a tree casts a shadow 10 meters long. Find the height of the tree.