Nishant eAcademy

CBSE Sample Paper Class 12 Mathematics 2023-24

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

Section A: Objective Type (20 marks)

1. Multiple Choice Questions: a) The derivative of e^x with respect to x is: (A) e^x (B) 1 (C) 0 (D) e^{-x}

b) If A and B are two events such that P(A) = $\frac{1}{3}$ and P(B) = $\frac{1}{4}$, then the probability of both A and B occurring is: (A) $\frac{1}{12}$ (B) $\frac{1}{7}$ (C) $\frac{1}{2}$ (D) $\frac{1}{10}$

2. Fill in the blanks: a) The value of sin $\frac{\pi}{6}$ is _____. b) The product of the roots of a quadratic equation $ax^2 + bx + c = 0$ is _____.

Section B: Short Answer Type (40 marks)

3. Find the equation of the tangent line to the curve $y = 3x^2 + 2x - 1$ at the point (1, 4).

4. Solve the following system of equations:
   $2x + 3y = 7$
   $4x - 5y = -6$

5. Prove that 22 is an irrational number.

6. Find the maximum and minimum values of the function $f(x) = x^3 - 3x^2 + 2$ in the interval [0, 3].

Section C: Long Answer Type (40 marks)

7. Find the value of x that satisfies the equation $\log_{10}(x^2 + 2x - 3) = 2$.

8. A ladder of length 10 meters is leaning against a wall. The base of the ladder is 6 meters away from the wall. Find the height at which the ladder touches the wall.

9. A bag contains 5 red balls and 7 blue balls. If two balls are drawn at random without replacement, find the probability that both balls are red.

10. A car travels at a speed of 60 km/h for the first half of the journey and 40 km/h for the second half. Find the average speed of the car for the whole journey.