
ISC CLASS XII MATHEMATICS (TEST PAPER 2)

Time Allowed: 3 hours

Maximum Marks: 80

Answers to Question 1

1. $\boxed{3}$
2. $\boxed{625}$
3. $\boxed{\frac{3}{4}}$
4. $\boxed{k = \pm 1}$
5. $\boxed{\text{Order} = 3, \text{Degree} = 2}$
6. $\boxed{\frac{\pi}{4}}$
7. $\boxed{\text{The function is neither one-one nor onto.}}$
8. $\boxed{\text{Local maximum at } x = \frac{1}{3}, \text{Local minimum at } x = 1}$
9. $\boxed{\text{Yes, } A \text{ and } B \text{ are independent.}}$
10. $\boxed{p = \frac{1}{3}}$

Answers to Question 2

1. $\boxed{\frac{dy}{dx} = \frac{(\cos x)^x [\ln(\cos x) - x \tan x] - yx^{y-1}}{1 - x^y \ln x}}$

2. LMVT is verified with $c = 2.5$

3. $\frac{1}{221}$

Answers to Question 3

1. $\frac{d^2y}{dx^2} = \frac{1}{a}$ at $\theta = \frac{\pi}{2}$

2. Tangent: $3x - 4y = 25$, Normal: $4x + 3y = 0$

3. 0

4. Verified (The determinant is $(a - b)(b - c)(c - a)$)

Answers to Question 4

1. Verified that semi-vertical angle $= \tan^{-1}(\sqrt{2})$

2. $y = \frac{\ln |\sin x|}{1 + x^2}$

3. $x = 1, y = 2, z = 3$

Answers to Question 5

(a) The relation R is an equivalence relation. Elements related to 2 : $\{2, 6, 10\}$

(b) The function f is one-one but not onto.

(c) $\frac{3}{8}$ (Probability that the die shows 6 given the man reports it's 6)

Answers to Section B

Solution to Question 6

(a) $\theta = \cos^{-1} \left(-\frac{\sqrt{2}}{3} \right)$ or $\theta = \cos^{-1} \left(\frac{\sqrt{2}}{3} \right)$

(b) $\text{Volume} = 7 \text{ cubic units}$

Solution to Question 7

1. $\text{Shortest distance} = \frac{8}{\sqrt{29}} \text{ units}$

2. $\text{Area} = \frac{9}{8} \text{ square units}$ (Area between the curves)

Answers to Section C

Solution to Question 8

1. $\begin{array}{l} \text{Marginal cost at } x = 10 : \text{Rs. } 29.90, \\ \text{Average cost at } x = 10 : \text{Rs. } 530.30, \\ x = 80 \text{ units (when MC = AC)} \end{array}$

Solution to Question 9

1. $\text{Minimum } Z = 7 \text{ at } x = 1.5, y = 0.5$

2. $\begin{array}{l} \text{Regression line of } y \text{ on } x : y = x + 5, \\ \text{Regression line of } x \text{ on } y : x = 0.64y + 4, \\ \text{When } y = 30 : x = 23.2 \end{array}$