
ISC CLASS XII MATHEMATICS (TEST PAPER 6) - SET 06

Time Allowed: 3 hours

Maximum Marks: 80

SECTION A (Compulsory - 65 Marks)

Question 1 (10×1 Mark = 10 Marks)

1. Yes, $*$ is commutative.
2. $\frac{2\pi}{3}$
3. -3
4. $[-\frac{\pi}{2}, \frac{\pi}{2}]$ (Corrected)
5. $-\frac{3}{4}$ (Corrected)
6. $e^x(x) + C$
7. 1
8. 0.3
9. 23
10. $\begin{pmatrix} 2 & -1 \end{pmatrix}$ (Corrected)

Question 2 (3×2 Marks = 6 Marks)

1. $\frac{dy}{dx} = -\cot t$ (Corrected)
2. $\frac{1}{90\pi}$ cm/min
3. $\frac{1}{6}$ (Corrected)

Question 3 (4×4 Marks = 16 Marks)

1. $X = \begin{pmatrix} -5 & 2 \\ -7 & -13 \end{pmatrix}$
2. $\frac{1}{2} \tan^{-1} \left(\frac{x-3}{2} \right) + C$
3. Verified by showing $f'(x) < 0$ for $x \in \left(0, \frac{\pi}{2}\right)$.
4. $y = \sin x + Ce^x$

Question 4 (3×6 Marks = 18 Marks)

1. $\boxed{\text{Depth is half the width.}}$
2. $\boxed{\frac{\pi^2}{4}}$
3. $\boxed{x = 1, \quad y = 1, \quad z = 1}$

Question 5 (15 Marks)

- (a) $\boxed{f^{-1}(x) = \sqrt{x-4}, \quad x \geq 4}$
- (b) $\boxed{\text{Mean} = 0.5, \quad \text{Variance} = 0.4167}$
- (c) $\boxed{\frac{1}{3}}$

SECTION B (Optional - 15 Marks)

Question 6 (5 Marks)

1. $\boxed{5\sqrt{3}}$ (Corrected)
2. $\boxed{-14}$ (Corrected)

Question 7 (10 Marks)

1. $\boxed{\text{Distance} = 4, \quad \text{Vector equation: } \vec{r} \cdot (3\hat{i} - 4\hat{j} + 12\hat{k}) = 52}$
2. $\boxed{\frac{8}{3}}$ (Corrected)

SECTION C (Optional - 15 Marks)

Question 8 (5 Marks)

1. $\boxed{\begin{array}{l} P(x) = 50x - 4x^2 - 200, \\ P'(x) = 50 - 8x, \\ x = 12.5 \end{array}}$

Question 9 (10 Marks)

1. $\boxed{\text{Minimum value of } Z \text{ is } 12 \text{ at the point } (4, 2)}$
2. $\boxed{\begin{array}{l} \text{Coefficient of correlation } (r) = -0.6325, \\ \text{Standard deviation of } x = \sqrt{5} \end{array}}$ (Corrected)