

CBSE TEST PAPER-01

CLASS - XII MATHEMATICS (Calculus : Continuity & differentiability)

Topic:- differentiation

1. Find the values of K so that the function f is continuous at the indicated point. [4]

$$f(x) = \begin{cases} \frac{K \cos x}{\pi - 2x}, & \text{if } x \neq \frac{\pi}{2} \\ 3, & \text{if } x = \frac{\pi}{2} \end{cases}$$

2. Differentiate the function $x^{\sin x} + (\sin x)^{\cos x}$ [4]

3. If $x = \sqrt{a^{\sin^{-1} t}}$, $y = \sqrt{a^{\cos^{-1} t}}$ show that $\frac{dy}{dx} = \frac{-y}{x}$ [4]

4. If $y = (\tan^{-1} x)^2$ show that $(x^2 + 1)^2 y_2 + 2x(x^2 + 1)y_1 = 2$ [4]

5. Verify Rolle's Theorem for the function $y = x^2 + 2$, $[-2, 2]$ [4]

6. Differentiate $\sin^{-1} \left[\frac{2^{x+1}}{1+4^x} \right]$ [4]

7. Differentiate $\sin^2 x$ w.r. to $e^{\cos x}$ [4]

8. If $x\sqrt{1+y} + y\sqrt{1+x} = 0$ prove that $\frac{dy}{dx} = -\frac{1}{(1+x)^2}$ [4]

9. If $\cos y = x \cos(a+y)$ prove that $\frac{dy}{dx} = \frac{\cos^2(a+y)}{\sin a}$ [4]

10. If $x = a(\cos t + t \sin t)$ [4]

$$y = a(\sin t - t \cos t)$$

$$\text{find } \frac{d^2 y}{dx^2}$$