

ATOMIC ENERGY EDUCATION SOCIETY, MUMBAI

CLASS: XII(MATHS)

WORKSHEET: MODULE 2/4

CHAPTER-5

TOPIC: CONTINUITY AND DIFFERENTIABILITY

Q1. Show that the function $f(x) = |x - 3|$, $x \in \mathbf{R}$, is continuous but not differentiable at $x = 3$

Q2. If $\cos y = x \cos(a + y)$, where $\cos a \neq \pm 1$, prove that $\frac{dy}{dx} = \frac{\cos^2(a+y)}{\sin a}$

Q3. Show that the function defined as follows, is continuous at $x = 1$, $x = 2$ but not differentiable at $x = 2$

$$f(x) = \begin{cases} 3x - 2, & 0 < x \leq 1 \\ 2x^2 - x, & 1 < x \leq 2 \\ 5x - 4, & x > 2 \end{cases}$$

Q4. If $xy + y^2 = \tan x + y$ then find $\frac{dy}{dx}$

Q5. Let $f(x) = x|x|$ for all $x \in \mathbf{R}$. Discuss the derivability of $f(x)$ at $x = 0$

Q6. If $y = \tan(x+y)$, find $\frac{dy}{dx}$

Q7. Differentiate $\sin^2 \sqrt{x}$ with respect to x

Q8. Find $\frac{dy}{dx}$ if $y = \sin^{-1}(x\sqrt{x})$

Q9. Differentiate $\log_7(\log x)$

Q10. Differentiate $\sin^{-1} \left[\frac{5x+12\sqrt{1-x^2}}{13} \right]$ w.r.to x

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