

The Open University of Sri Lanka
B.Sc./B.Ed. Degree Programme
No Book Test (NBT) - 2021/2022
Pure Mathematics - Level 04
PEU4316 -Differentiable Functions



Duration: One Hour.

Date: 11.02.2023

Time: 02.30 p.m. – 03.30 p.m.

Answer all Questions.

Q1). Let $g: \mathbb{R} \rightarrow \mathbb{R}$ be defined by

$$g(x) = \begin{cases} 2x^3 - x + 1, & x \leq 1 \\ 3x^2 - 1, & x \geq 1 \end{cases}$$

Show that

- (i) g is left differentiable at $x = 1$ and $g'_-(1) = 5$, and
- (ii) g is right differentiable at $x = 1$ and $g'_+(1) = 6$.

[100 Marks]

Q2). Let $h(x) = \sqrt{5x}$, $x \in (0, \infty)$. By using the definition of derivative, show that h is differentiable at $x = 5$ and $h'(5) = \frac{1}{2}$.

[100 Marks]

Q3). State the Mean Value Theorem.

Prove that for each $x, y \in \mathbb{R}$, $|\sin x - \sin y| \leq |x - y|$.

[100 Marks]

