The Open University of Sri Lanka

B.Sc./B.Ed. Degree Programme

Open Book Test (OBT) – 2021/2022

Pure Mathematics – Level 04

PEU4316 – Differentiable Functions

Duration: - One Hour.

Date: - 21.01.2023 **Time: - 02.30 p.m. – 03.30 p.m.**

Answer All Questions

Q1) State the $\varepsilon - \delta$ definition of a differentiable function.

Let function g be defined by $g(y) = 6y + 8,\ y \in \mathbb{R}$.

Show that g is differentiable at $y = 2$ and $g'(2) = 6$.

[30 Marks]

Q2) Let $h(x) = \frac{3x+4}{2x-1}, x \in \mathbb{R}\setminus\left\{\frac{1}{2}\right\}$.

(i) Simplify the expression $\frac{h(x)-h(1)}{x-1}$.

(ii) Use the definition of derivative to find $h'(1)$.

[30 Marks]

Q3) Let h be a function defined on an open interval $I \subseteq \mathbb{R}$. If h is differentiable at a point $k \in I$ then show that h is continuous at k.

Is the converse of the above statement true?

Justify your answer.

[40 Marks]

..... End .....