

The Open University of Sri Lanka  
 Department of Mathematics  
 B. Sc/ B. Ed Degree Programme  
 No Book Test - 2019/ 2020  
 Pure Mathematics- Level 04



PEU4301 – Real Analysis II

Duration: One Hour

Date: 11.08.2020

Time: 4.15 p.m. - 5.15 p.m.

ANSWER All Questions

Total Marks = 100

**Q1)** Let  $f(x) = \sqrt{x-7}$ ,  $x \in [7, +\infty)$ . Show that  $f$  is continuous on the interval  $[7, +\infty)$ .

30 marks

**Q2)**  $g: \mathbb{R} \rightarrow \mathbb{R}$  be defined by

$$g(x) = \begin{cases} \frac{x}{1+x} & x \geq 0 \\ x^2 & x < 0 \end{cases}$$

- (i) Find expressions for  $\frac{g(x)-g(0)}{x-0}$  when  $x < 0$  and  $x > 0$ .  
 (ii) Find  $g'_-(0)$  and  $g'_+(0)$ .  
 (iii) Is  $g$  differentiable at point  $x = 0$ ? Justify your answer

40 marks

**Q3)** Let  $h(x) = \frac{3x+4}{2x-1}$ ,  $x \in \mathbb{R} \setminus \{1/2\}$ .

- (i) Simplify the expression  $\frac{h(x)-h(1)}{x-1}$ .  
 (ii) Use the definition of derivative to find  $h'(1)$ .

30 marks

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