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The Open University of Sri Lanka

B.Sc/B.Ed Degree programme

Pure Mathematics – Level 03

PEU3300 –Mathematical Logic & Mathematical Proofs

No Book Test - 2024/2025

DURATION: ONE HOUR

Date: 05.10.2024 **Time: 04.00 p.m. - 05.00 p.m.**

Answer All Questions.

1. Consider the statement if n is an odd integer then $5n - 3$ is an even integer.
   Prove the given statement using the method of conditional proof:

2. Complete the proof of the statement if $(n + 1)^2 - 1$ is even then n is even where $n \epsilon \mathbb{Z}$, given below.

   ..... (1)

   Assume n is odd.

   ..... (2)

   ..... (3)

   ..... since $2m^2 + 4m + 1$ is an integer (4)

   ..... (5)

   ..... (6)

3. Prove or disprove each of the following statements.

   (a) There exists a real number x such that $x^2 = -1$.

   (b) For every real number x, $x^2 - 1 > 0$.

   (c) For each real number x, $\sqrt{x^2} = x$.

   (d) There exists an integer n, such that $(4n - 3)/3$ is an integer.