MTH101A: 2021 - 2022

Mid-Semester Exam: Question 3
Time: 11:00 am - 11:30 am

Q1. (a) Does the following series converge? Does it converge absolutely?

$$\sum_{n=1}^{\infty} \frac{(-1)^n}{5n + (\log_e n)^3}.$$

[6 marks]

(b) Find the Maclaurin series for $f(x) = \frac{1}{1+2x^2}$. Find all $x \in \mathbb{R}$ such that the Maclaurin series is convergent at x. **[6 marks]**

(c) Determine the radius of convergence of the power series

$$\sum_{n=0}^{\infty} \frac{n^3}{n^4 + 1} x^{3n}.$$

[3 marks]