MTH101A: 2021 - 2022

Mock Exam: Question 3
Time: 7:00 - 7:30 pm

Q3. (a) Let $P(x)$ be a polynomial which has at least two distinct real roots. Show that $P'(x) + 10P(x)$ has a real root.

[7 marks]

(b) Let $f : [-1, 1] \to \mathbb{R}$ be a twice differentiable function such that $f'(0) = 0$ and $f(1) = f(-1)$. Show that there exist $c_1 \in [-1, 0]$ and $c_2 \in [0, 1]$ such that $f''(c_1) = f''(c_2)$.

[8 marks]