

MA1E01: Tutorial week 9

REMEMBER TO HAND BEFORE THE TUTORIAL STARTS

- Mean value theorem.
- log, exp functions.

Problem 1 *Prove that the function*

$$f(x) = 3x - \sin x + 7$$

has at most one root.

Problem 2 *A function $f(x)$ is continuous and differentiable in $[0, 1]$. If $f'(x) \leq 10$ for all $x \in [0, 1]$ and $f(0) = 0$, what is the maximum possible value of $f(x)$ for x in $[0, 1]$.*

NOTE: *If the “proof” seems difficult, try to think in this: “A car starts a journey at a speed that never exceeds 120km/h. What is the maximum distance that can be travelled in 1h?”.*