NAME/SURNAME:..... STUDENT NO:.....
DEPARTMENT:..... DATE:.02.12.2024.....

MATH 105 — Section 05 — QUIZ # 4

Problem 1 Let $f(x) = \frac{1}{3}x^3 + \frac{1}{2}x^2 - 6x + 8$.

(a) (5 points). Find the critical points of $f(x)$.

(b) (5 points). Find the points at which $f(x)$ has a local extremum.

(c) (5 points). Find the intervals on which $f(x)$ is increasing or decreasing.

(d) (5 points). Sketch the graph of $f(x)$.

Problem 2 (a) (10 points). Determine whether Rolle's Theorem is applicable for the following functions. If it is, find the c values.

(i) $f(x) = \dfrac{x^2 - 3x - 4}{x - 5}$ on $[-1, 4]$

(ii) $f(x) = |x^2 - 4|$ on $[0, 8]$

(b) (10 points). Find the values of c guaranteed by the Mean Value Theorem for

$$f(x) = \begin{cases} 2x - 3, & 0 \leq x \leq 2, \\ 6x - x^2 - 7, & 2 < x \leq 3. \end{cases}$$