

NAME/SURNAME:..... STUDENT NO:.....  
DEPARTMENT:..... DATE:19.11.2024.....

**MATH 105 — Section 04 — QUIZ # 3**

**Problem 1 (a) (10 points).** Let  $C$  be a constant and  $f$  be a differentiable function. Prove that

$$(C \cdot f(x))' = C \cdot f'(x).$$

**Hint.** Use the definition of derivative as  $h \rightarrow 0$ .

**(b) (10 points).** If  $y = \sin x + 2 \cos x$ , show that  $y''' + y'' + y' + y = 0$ .

**Problem 2 (20 points).** A 25-foot ladder rests against a vertical wall. If the bottom of the ladder is sliding away from the base of the wall at the rate of 3ft/sec, how fast is the top of the ladder moving down the wall when the bottom of the ladder is 7 feet from the base?

**Note.** *ladder: a set of rungs or steps between two long supports, for climbing up or down*