NAME/SURNAME:..... STUDENT NO:.....
DEPARTMENT:..... DATE:.18.11.2024.....

MATH 105 — Section 05 — QUIZ # 3

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

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

(b) (10 points). If $u = A\sin(kt) + B\cos(kt)$, where A, B and k are constants, show that $\dfrac{d^2u}{dt^2} = -k^2u$.

Problem 2 (20 points). A weight W is attached to a rope 50ft long that passes over a pulley at a point P, 20ft above the ground. The other end of the rope is attached to a truck at a point A, 2ft above the ground. If the truck moves away at the rate of 9ft/sec, how fast is the weight rising when it is 6ft above the ground?

Note. *rope: very thick string made from twisted thread*
pulley: a wheel with a rope going round it which is used to lift things
truck: a large road vehicle