

MATH 31 - Calculus. Homework 3. Due Th. 09/23/2026. Professor Luis Fernández

NAME: _____

Do not write your answers here.

Write your answers in other sheets and **STAPLE them to this one.**

1. Let $r(x) = f(g(h(x)))$, where $h(1) = 2$, $g(2) = 3$, $h'(1) = 2$, $g'(2) = 5$ and $f'(3) = 6$. Find $r'(1)$.

2. Evaluate, justifying your answer:

(a) $\lim_{x \rightarrow \infty} x \sin \left(\frac{1}{x} \right)$ [HINT: do a change of variable $t = \frac{1}{x}$.]

(b) $\lim_{x \rightarrow 0} \frac{\tan x}{x}$

3. If $g(x) = xf(x)$, where $f(3) = 4$ and $f'(3) = -2$, find an equation of the tangent line to the graph of g at the point where $x = 3$.