

Mathematics 1110H – Calculus I: Limits, Derivatives, and Integrals

TRENT UNIVERSITY, Fall 2025

Workshop Problems for 2025-10-03

Where you reasonably can, try to simplify the answers. In some cases (*e.g.* the second and fourth problems), it pays to try to simplify first.

- Use the limit definition of the derivative to compute $f'(x)$ for $f(x) = x^2 - x$. [You better get $f'(x) = 2x - 1$, or else ...]
- Compute $\frac{d}{dx} \left(\frac{x^2 - 11x + 10}{x^2 - 12x + 20} \right)$. [$y' = -1/(x - 2)^2$]
- Compute $\frac{d}{dx} \ln(\sec(x) + \tan(x))$. [$y' = \sec(x)$]
- Compute $\frac{d}{dx} e^{2\ln(x)+1}$. [$y' = 2ex$, not $y' = 2e^x$]
- Compute $\frac{d}{dx} \left(\frac{x}{x^2 - 1} \right)$. [$y' = -1/(x^2 - 1)$]
- Compute $\frac{d}{dx} \left(e^{\sec(x)} \tan(x) \right)$. [$y' = (\sec^3(x) + \sec^2(x) - \sec(x)) e^{\sec(x)}$, among other forms]
- [For mathochists. Very unlikely to turn up on a test or exam.] Use the limit definition of the derivative to verify the Product Rule for derivatives.