

# 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  $\frac{d}{dx} (e^{\sec(x)} \tan(x))$ . [ $y' = (\sec^3(x) + \sec^2(x) - \sec(x)) e^{\sec(x)}$ , 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.