

TRENT UNIVERSITY, Summer 2026 (S62)

MATH 1110H Midterm Test

10:50–11:50 a.m. on Tuesday, 7 July.

Name: _____

STUDENT NUMBER: _____

Question	Mark
1	_____
2	_____
3	_____
Total	_____ /30

Instructions

- *Show all your work.* Legibly, please! Simplify where you reasonably can.
- *If you have a question, ask it!*
- Use the back sides of all the pages for rough work or extra space.
- You may use a calculator and all sides of one letter- or A4-size aid sheet.
- If you do more than the minimum number of parts or questions, only the first ones the marker finds will be marked. Cross out anything you do not want marked.

1. Do any *two* (2) of parts **a–c**. [$10 = 2 \times 5$ each]

a. Use the ε - δ definition of limits to check that $\lim_{x \rightarrow -1} (4x + 3) = -1$.

b. Compute $\lim_{x \rightarrow \infty} \frac{x}{\ln(x)}$. **c.** Compute $\lim_{x \rightarrow 4} \frac{x^2 - 16}{x^2 - 2x - 8}$.

2. Find $\frac{dy}{dx}$ as best you can in any *two* (2) of parts **a–c**. [$10 = 2 \times 5$ each]

a. $y = \arctan(1/\sqrt{x})$ **b.** $y = \frac{x}{x^2 - 2x + 1}$ **c.** $e^{xy} = 41$

3. Do *one* (1) of parts **a** or **b**. [10]

- a.** Find the domain as well as any and all intercepts, horizontal and vertical asymptotes, intervals of increase and decrease, local maximum and minimum points, intervals of concavity, and inflection points of $f(x) = \frac{1}{x^2 + 1}$, and sketch its graph based on this information.
- b.** Determine the maximum possible area of a rectangle with two corners on the x -axis and the other two corners on the part of the parabola $y = 4 - x^2$ that is above the x -axis.

[Total = 30]