

Math 131 - Assignment 2

January 29, 2025

Name _____

Score _____

Show all work to receive full credit. Supply explanations when necessary. This assignment is due February 5.

1. Find the limit analytically: $\lim_{x \rightarrow -5} \left(\frac{x^2 + 3x - 10}{x^3 + 11x^2 + 30x} \right)$

2. Find the limit analytically: $\lim_{x \rightarrow 1} \frac{\sqrt{x+3} - 2}{x-1}$

3. Find the limit analytically: $\lim_{w \rightarrow 0} \frac{(w+6)^2 - 36}{w}$

4. Find the limit analytically: $\lim_{x \rightarrow 4} \frac{\frac{1}{2} - \frac{1}{x-2}}{x-4}$

5. Explain why direct substitution cannot be used to evaluate the limit: $\lim_{x \rightarrow 1} \sqrt{1-x^2}$

Turn over.

6. Find the limit analytically: $\lim_{y \rightarrow 0} \frac{\tan(6y)}{3y}$

7. Find the limit analytically: $\lim_{t \rightarrow 3^-} \frac{t^2 - t - 6}{|t - 3|}$

8. Determine the value of the constant k so that $\lim_{x \rightarrow 4} g(x)$ exists.

$$g(x) = \begin{cases} kx + \sin(\pi x), & x \leq 4 \\ x \cos(\pi x) - x^2, & x > 4 \end{cases}$$

9. Find the limit analytically: $\lim_{x \rightarrow -2^+} (5x^2 - 10x + 13)$

10. Give an example of a one-sided limit that does not exist and say why.