

Math 131 - Quiz 4

September 16, 2026

Name _____

Score _____

Show all work to receive full credit. Supply explanations where necessary.

1. (3 points) Determine if f is continuous at $x = 0$. If not, classify the discontinuity. For full credit, your work must show how you are using limits and the definition of continuity.

$$f(x) = \begin{cases} x^2 - e^x, & x < 0 \\ x - 1, & x \geq 0 \end{cases}$$

2. (3 points) Find the value of k that makes f continuous on its domain. For full credit, your work must show how you are using limits and the definition of continuity.

$$f(x) = \begin{cases} 3x + 2, & x < k \\ 2x - 3, & k \leq x \leq 8 \end{cases}$$

3. (2 points) Find and classify all discontinuities of $f(x) = \frac{\sin x}{x}$.

4. (2 points) Use the Intermediate Value Theorem (IVT) to find an interval of length one (or less) on which $x^5 + 4x + 1 = 0$ has a solution. Your work must show how you used the IVT.