Math 131 - Quiz 4

Name _____

September 18, 2025

Score _____

Show all work to receive credit. Supply explanations where necessary. The take-home problem is due September 23.

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1. (2 points) Sketch the graph of a function that has a limit at $x = 3$, but is not continuous at $x = 3$. Then classify the discontinuity.

2. (2 points) Find and classify the discontinuities of $g(x) = \dfrac{4\cos x + 9\sin x}{x^2 - 9}$. You must show work that supports your answer.

3. (3 points) Find the number k that makes f continuous everywhere. For full credit, you work must show how you are using limits and the definition of continuity.

$$f(x) = \begin{cases} x + 6\cos(\pi x), & x \leq 2 \\ kx^2 - 2x + 5, & x > 2 \end{cases}$$

4. (3 points) Use the limit definition of derivative to find $f'(x)$. Show all work.

$$f(x) = 1 + 5x - x^2$$