Math 131 - Quiz 4

September 21, 2023

Name _____

Score _____

Show all work to receive full credit. Supply explanations when necessary. This quiz is due September 26.

1. (2 points) Find the numbers a and b so that f is continuous everywhere.

$$f(x) = \begin{cases} ax^2 + bx + 6, & x < 2 \\ 10, & x = 2 \\ b + 14\cos(\pi x), & x > 2 \end{cases}$$

2. (2 points) Find and classify the discontinuities of $Q(x) = \dfrac{x^2 - x - 2}{x^3 + x^2 - 6x}$.

3. (2 points) Find an interval of length one that contains a solution of the equation $x^3 - 5x^2 + x - 10 = 0$. Use the Intermediate Value Theorem to explain your answer.

4. (4 points) Let $f(x) = 5 + x - x^2$.

   (a) Use the limit definition of the derivative to find $f'(x)$.

   (b) Using your answer from part (a), find an equation of the line tangent to the graph of f at the point where $x = 2$.