

Math 131 - Quiz 11

November 19, 2025

Name _____

Score _____

Show all work to receive credit. Supply explanations where necessary. Use extra paper as necessary. This quiz is due December 1.

1. (5 points) Let $f(x) = \frac{x}{(1+x)^2}$.

- (a) Find open intervals on which f is increasing/decreasing.
- (b) Find all relative extreme values.
- (c) Find open intervals on which the graph of f is concave up/down.
- (d) Identify all inflection points.
- (e) Find all vertical and horizontal asymptotes of the graph of f .

Turn over.

2. (1 point) Use the 2nd derivative to determine if the graph of $g(x) = x^4 + \sin(1000x)$ is concave up or down at the point where $x = \pi/100$.

3. (2 points) Evaluate each limit. Show all work.

(a) $\lim_{x \rightarrow \infty} \left(\frac{5 - x^{3/2}}{1 + 2x^{1/2} + 3x^{3/2}} \right)$

(b) $\lim_{x \rightarrow -\infty} \left(\frac{5 - x - x^2}{x - 6x^2 - x^3} \right)$

4. (2 points) Find the critical numbers of $f(x) = x^4 + 4x^3 - 36x^2$. Then use the 2nd derivative to determine if each gives relative max and relative min.