Math 131 - Quiz 11

Name _____

November 20, 2025

Score _____

Show all work to receive credit. Supply explanations where necessary. Use extra paper as necessary. This quiz is due December 2.

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

   (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) $\lim_{x\to\infty} \left(\dfrac{5 - x^{3/2}}{1 + 2x^{1/2} + 3x^{3/2}} \right)$

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

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.