

Math 131 - Quiz 10

April 21, 2022

Name _____

Score _____

Show all work to receive full credit. Supply explanations when necessary. This quiz is due April 28.

1. (6 points) The function f and its first two derivatives are shown below:

$$f(x) = x^{2/3}(6-x)^{1/3}, \quad f'(x) = \frac{4-x}{x^{1/3}(6-x)^{2/3}}, \quad f''(x) = \frac{-8}{x^{4/3}(6-x)^{5/3}}.$$

Use calculus techniques to find open intervals on which f is increasing/decreasing. Identify all relative extrema. Find open intervals on which the graph of f is concave up/down. Identify all inflection points.

Turn over.

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

(a) $\lim_{x \rightarrow \infty} \frac{5x^3 + 7x^2 - 8x}{2x^3 - 1017x^2 - 93}$

(b) $\lim_{x \rightarrow -\infty} \frac{x + 2}{\sqrt{4x^2 + 1}}$

3. (1 point) Find all vertical and horizontal asymptotes of the graph of $y = \frac{x^2 + 2x}{x^3 + x^2 - 2x}$.
(You don't need to show each limit. Use shortcuts.)