Math 131 - Quiz 10

Name _____

April 20, 2022

Score _____

Show all work to receive full credit. Supply explanations when necessary. This quiz is due April 25.

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

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

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) $\lim_{x\to\infty} \dfrac{5x^3+7x^2-8x}{2x^3-1017x^2-93}$

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

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