NAME

Time: 20 minutes

Instructions. This quiz will be graded for accuracy, out of 10 points. Calculators, books, notes and suchlike aides to gracious living are not permitted. Make sure to show all your work for full credit.

1. (4 points) Find the absolute minimum and absolute maximum for the function \( f(x) \) on the given interval:

\[
f(x) = x + \frac{1}{x} \quad \text{on} \quad \left[ \frac{2}{10}, 4 \right]
\]

2. (3 points) Use linear approximation to get a good estimate for \( \sqrt{100.5} \). Explain why your estimate is an overestimate or an underestimate.
3. **(2 points)** A function \( f(x) \) is differentiable on the interval \((-\infty, \infty)\) and has the following first derivative.

\[
f'(x) = 3x^4 - 32x^3 + 96x^2
\]

(a) Find \( f''(x) \).

(b) State each interval upon which the function \( f(x) \) is concave up.

(c) State each interval upon which the function \( f(x) \) is concave down.

(d) Find the x-coordinate for each inflection point of \( f(x) \).

4. **(1 point)** State the Mean Value Theorem. Be sure to include "if" and "then".