

Name: _____

Calculus Practice Quiz #3

This quiz is to determine if you have mastered the material by attending tutoring sessions and completing your homework. Please write legibly and show as much work as possible for each problem.

1. Find the critical numbers of each function.

a. $f(x) = (\tan 2x) - 4x$, $\left(-\frac{\pi}{4}, \frac{\pi}{4}\right)$ b. $f(x) = x^{8/3} - 4x^{2/3}$

2. Locate the absolute extrema of each function on the indicated interval.

a. $f(x) = x^{2/3} \left(\frac{x^2}{2} - 2 \right)$, $[0, 8]$ b. $f(x) = \sqrt{1 + 2 \cos x}$, $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$

c. $f(x) = x^2 \sqrt{5 - x}$, $[-4, 5]$ d. $f(x) = 6x^{2/3} - 2x$, $[-8, 27]$

3. a. State Rolle's Theorem.

b. Determine if Rolle's Theorem applies to each function below. If so, find the values of c that guarantee the theorem. If the theorem fails, state why.

I. $f(x) = x - 3(x+1)^{1/3}$, $[-1, 7]$ II. $f(x) = \sqrt[3]{x} + 8x$, $[-1, 8]$

4. a. State the Mean Value Theorem.

b. Determine if the Mean Value Theorem applies to each function below. If so, find the value of c that guarantees the theorem. If the theorem fails, state why.

I. $f(x) = 2 \cos x + \cos 2x$, $\left[\frac{\pi}{2}, \frac{3\pi}{2}\right]$ II. $f(x) = 3 \cos^2 x$, $\left[\frac{\pi}{2}, \frac{3\pi}{2}\right]$