

Math 180
Fall, 2008

Name _____

Homework #11

Due Monday, October 27

No late papers accepted! No excuses!

1. Determine if the Mean Value Theorem can be applied. If it can be applied, find the value of c guaranteed. If it cannot be applied, explain why.

$$f(x) = \sqrt{x-2}$$

[2.6]

2. Let $f(x) = (x-1)^{-2}$. Show that $f(0) = f(2)$ but there is no number c in the open interval $(0,2)$ such that $f'(c) = 0$. Why does this not contradict Rolle's Theorem.

3. Show that the equation $2x - 1 - \sin x = 0$ has exactly one root.

4. For what values of a and b does the function

$$f(x) = x^3 + ax^2 + bx + 2$$

have a local maximum when $x = -3$ and a local minimum when $x = -1$?

5. Let $f(x) = x^{\frac{1}{3}}(x + 4)$.
- Find the intervals of increase or decrease.
 - Find the local maximum and minimum values.
 - Find the intervals of concavity and the inflection points.
 - Use this information to sketch the graph.

6. Find the horizontal asymptotes of the curve $y = \frac{x}{\sqrt{x^2 + 1}}$. Determine the concavity of the graph of the curve.

7. Let $f(x) = 2 \cos x + \sin(2x)$ $[-2\pi, 2\pi]$.

- a. Find the intercepts.
- b. Find the critical points.
- c. Find the local maximums and local minimums.
- d. Find the inflection points.
- e. Find the intervals where the graph of the curve is increasing or decreasing.
- f. Find the intervals where the graph of the curve is concave up or concave down.
- g. Sketch the graph.