

Math 180  
Fall, 2008

Name \_\_\_\_\_

Homework #12

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.