

# Math 1910-001: Practice Test Two

March 14, 2011

*Professor Z. Sinkala*

Your Name:.....

**Problem 1**

Use Newton's method to approximate a real zero of the function accurate to three decimal places.

$$f(x) = x^4 - 6x^2 + x + 5$$

using initial guess  $x_1 = -1$

## Problem 2

Find the derivative of the function

$$h(x) = \tan(e^{3x} + e^{-3x})$$

### Problem 3

Can mean Value Theorem be applied to the function  $f(x) = \frac{1}{x^2}$  on the interval  $[1, 2]$ ? Explain.

## Problem 4

Find the derivative of the function  $h(x) = \sec^2(x) \cot(x)$

**Problem 5**

Use logarithmic differentiation to find  $dy/dx$  when

$$y = \frac{(x^4 - 3)^3(x^2 - 6)^4}{(x^2 + 2)^6}$$

**Problem 6**

Find the equation of the tangent line to the curve

$$y = \frac{x^2 - 1}{x^2 + 1}$$

at point  $(0, -1)$ .

**Problem 7**

Let

$$f(x) = \begin{cases} -x^2 + x + 2 & x < 0 \\ 2 - 4x - x^2 & \geq 0. \end{cases}$$

- (a) Is the function continuous at  $x = 0$ ?
- (b) Is the function differentiable at  $x = 0$ ?

**Problem 8**

Find the absolute extrema of the function on the closed interval

(a)

$$f(x) = 3x^{\frac{2}{3}} - 2x, \quad [-1, 1]$$

(b)

$$f(x) = -x^2 + 3x - 5, \quad [-2, 1]$$