NAME:_____

MATH 181 QUIZ 3 FALL 2009

This is due Thursday, Oct. 22nd. PLEASE SHOW ALL WORK!

1.) Find the absolute minimum and maximum of $y = x - \frac{4x}{x+1}$ on [0, 3].

Minimum:_____

Maximum:_____

2.) Find the absolute minimum and maximum of $f(x) = (x^2 - 4)^{\frac{1}{3}}$ on [-1, $\sqrt{5}$].

Minimum:_____

Maximum:_____

3.) Find the absolute minimum and maximum of $f(\theta) = \sin\theta + \cos\theta$ on [0, 2π].

Minimum:_____

Maximum:_____

In problems 4 & 5, determine whether Rolle's Theorem can be applied to f on the closed interval [a, b] and indicate why or why not it can be applied. If Rolle's Theorem can be applied, find all values of c in the open interval (a, b) such that $f'(c) = 0$.

4.) $f(x) = \tan(\pi x)$ on [0, 1]

Can Rolle's be applied?_____

Why or why not?_____

_____

critical values:_____
(if possible)

5.) $f(x) = \dfrac{x^2 - 5x - 6}{(x+4)^2}$ on [-1, 6]

Can Rolle's be applied?_____

Why or why not?_____

_____

critical values:_____
(if possible)

6.) Find all values of c that satisfy the equation $\dfrac{f(b) - f(a)}{b - a} = f'(c)$ in the conclusion of the Mean Value Theorem if $f(x) = \dfrac{x}{x+1}$ on [3, 6].

6._____

7.) Find all values of c that satisfy the equation $\dfrac{f(b) - f(a)}{b - a} = f'(c)$ in the conclusion of the Mean Value Theorem if $f(x) = \sqrt{x(1-x)}$ on [0, 1].

7._____

8.) (8 pts) Use $f(x) = \dfrac{1}{\cos x + 2}$ on $\left[\dfrac{\pi}{4}, \dfrac{7\pi}{4}\right]$ to find the critical numbers, interval(s) of increasing / decreasing, and any relative extrema using the First Derivative Test.

Critical numbers:_____

Increasing:_____

Decreasing;_____

Relative Max:_____

Relative Min:_____

9.) (7 pts) Use $f(x) = \dfrac{4}{x^2 + 2}$ to find the critical #s, interval(s) of increasing / decreasing, and any relative extrema using the First Derivative Test.

Critical numbers:_____

Increasing:_____

Decreasing:_____

Relative Max:_____

Relative Min:_____

10.) (10 pts) Use $f(x) = (x^2 - 4)^{\frac{1}{3}}$ to find the critical #s, interval(s) of concavity, and any relative extrema using the Second Derivative Test.

Critical numbers:_____

Inflection pts:_____

Increasing:_____

Decreasing:_____

Concave up:_____

Concave down:_____

Relative Max:_____

Relative Min:_____

11.) (10 pts) Use $f(x) = \tan x + 2x$ on $\left(-\dfrac{\pi}{2}, \dfrac{\pi}{2}\right)$ to find the critical #s, interval(s) of concavity, and any relative extrema using the Second Derivative Test.

Critical numbers:_____

Inflection pts:_____

Increasing:_____

Decreasing:_____

Concave up:_____

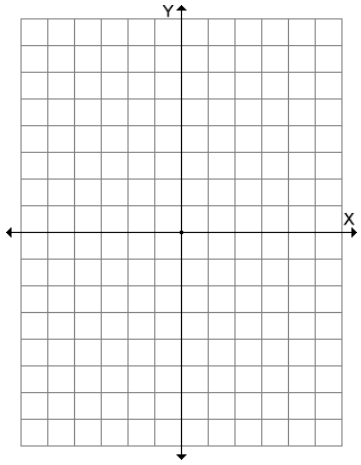
Concave down:_____

Relative Max:_____

Relative Min:_____

12.) (15 points) Find the following and graph:

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



Critical points:_____

Inflection pts:_____

Concave up:_____

Concave down:_____

Increasing:_____

Decreasing:_____

Relative Max:_____

Relative Min:_____

Vertical asy:_____

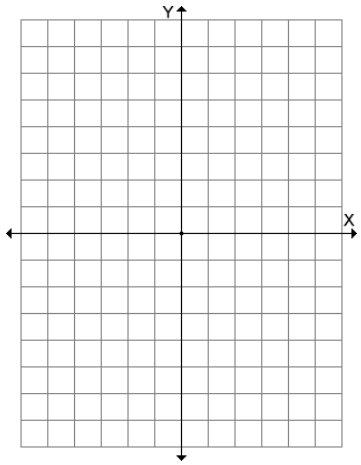
Horizontal asy:_____

x-intercept(s):_____

y-intercept:_____

13.) (15 points) Find the following and graph:

$$y = \frac{1}{4}\left(x^2 - 4\right)^2$$



Critical points:_____

Inflection pts:_____

Concave up:_____

Concave down:_____

Increasing:_____

Decreasing:_____

Relative Max:_____

Relative Min:_____

Vertical asy:_____

Horizontal asy:_____

x-intercept(s):_____

y-intercept:_____