MA 125 - CO, CALCULUS I
Exam II, September 23, 2010

Name (Print last name first): .....

Student Signature: .....

TEST II

No calculators are allowed!

PART I

Part I consists of 10 questions. Clearly write your answer in the space provided after each question. Show your work as much as possible.

Each question in Part I is worth 5 points.

Question 1

Differentiate the function $y = f(x) = (x^3 - 1)(x^3 + 1)$. (Simplify your answer!)

Answer: .....

Question 2

Differentiate the function $y = f(x) = \frac{x^2 - x}{x}$.

Answer: .....

Question 3

Find $f'(x)$ if $y = f(x) = x^2 \cos(x)$.

Answer: .....

Question 4

Differentiate the function $y = f(x) = \frac{x+1}{x-1}$. **Simplify your answer!**

Answer: .....

Question 5

Differentiate the function $y = f(x) = \sec(x^2)$.

Answer: .....

Question 6

Find $y' = \frac{dy}{dx}$ if $x^3 + y^3 = 5$.

Answer: .....

Question 7

Differentiate the function $y = \tan(\cos(x^5))$. **Do not simplify**

Answer: .....

Question 8

Find all values x in the domain of the function $y = f(x) = x^3/3 + x^2/2 - 2x$ where the tangent line is horizontal at (x, y).

Answer: .....

Question 9

Differentiate the function $y = \sqrt{x^2 + x}$.

Answer: .....

Question 10

If $S(t) = (t^3 + 1)^2$ is the position of a particle at time t, find the velocity at time $t = 1$.

Answer: .....

PART II

Each problem is worth 10 points.

Part II consists of 5 problems. You must show your work on this part of the test to get full credit. Displaying only the final answer (even if correct) without the relevant steps will not get full credit.

Problem 1

Find the equation of the tangent line to the graph of the function $y = f(x) = x^2(2-x)^3$ at the point with $x = 1$.

Problem 2

Find y' if $\cos(xy) = x^2y^2$.

Problem 3

Find the derivative of the function $y = f(x) = \left(\frac{x^2+1}{x^2-1}\right)^3$. You must simplify the fraction.

Problem 4

If one side of a rectangle increases ar a rate of 2 m/s and the other side decreases at a rate of 3 m/s, find the rate of change of the area when the first side is 4 m and the second side is 5 m.

Problem 5

Water is being pumped into a conical reservoir (like an ice cream cone) of height 15m and radius 3m at the rate of 1 $m^3/hour$. How fast is the water level rising when the height of the water is 5m from the bottom? [Show *all* your work!!]