MA 125 CW, CALCULUS I

December 1, 2016

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

TEST IV

Show all your work! No partial credit will be given for the answer only!

PART I

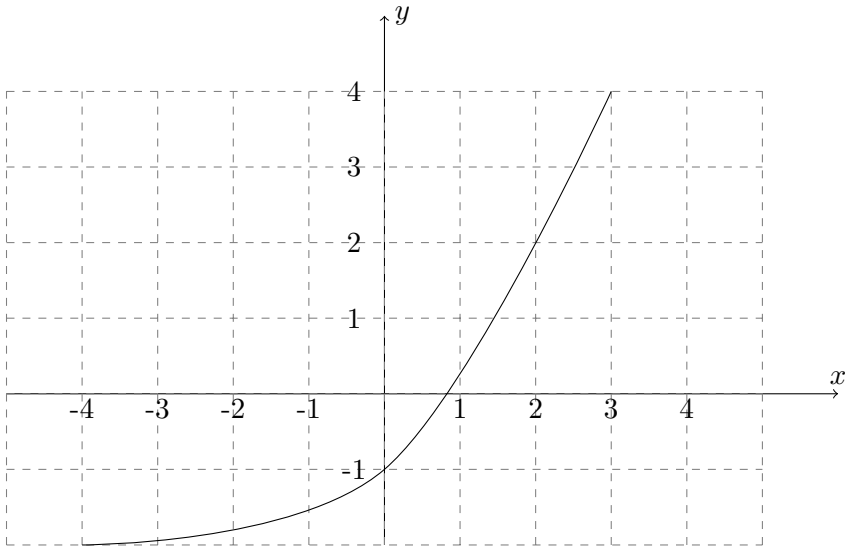
Part I consists of 8 questions. Clearly write your answer in the space provided after each question. Show all of your your work!

All problems in Part I are 8 points each.

Question 1

Given the graph of the function below find

1. $f(2)$
2. Is f one-to-one?
3. $f^{-1}(1)$
4. $(f^{-1})'(1)$



Question 2

Find the derivative of $f(x) = xe^x$

Question 3

Find the derivative of $y = f(x) = \ln(x^4)$.

Question 4

Evaluate $\int e^{-x}\,dx$

Question 5

Evaluate $\int e^{\sin(x)}\cos(x)\,dx$

Question 6

Solve $\ln(2x + 5) = 3$

Question 7

Use Newton's method to find the second approximate solution x_2 of the equation $f(x) = x^3 + \sin(x) - \frac{1}{10} = 0$ if $x_1 = 0$

Question 8

Show that the function $y = f(x) = x^3 + 1$ is one-to-one and find its inverse function $f^{-1}(x)$.

PART II

Part II consists of 3 problems. You must show correct reasons to get full credit. Displaying only the final answer (even if correct) without the relevant steps will not get full credit.

Problem 1 (12 points)

Evaluate

$$\int_1^2 \frac{\sin(x)\cos(x)}{\sin^2(x)+1}\,dx$$

Problem 2 (12 points)

Use logarithmic differentiation to find the derivative of

$$f(x) = \frac{\sqrt[3]{x^2+1}}{2x-5}$$

You must simplify your answer!

Problem 3 (12 points)

Find the absolute maximum and minimum of the function $y = f(x) = x^2 \ln(x)$ on the interval $[\frac{1}{10}, 2]$.