MATH 1271 Fall 2013, Midterm #1
Handout date: Thursday 10 October 2013

PRINT YOUR NAME:

PRINT YOUR TA'S NAME:

WHAT RECITATION SECTION ARE YOU IN?

Closed book, closed notes, no calculators/PDAs; no reference materials of any kind. Turn off all handheld devices, including cell phones.

Show work; a correct answer, by itself, may be insufficient for credit. Arithmetic need not be simplified, unless the problem requests it.

I understand the above, and I understand that cheating has severe consequences, from a failing grade to expulsion.

SIGN YOUR NAME:

I. Multiple choice

A. (5 pts) (no partial credit) Compute $\lim_{x \to -\infty} \left[\frac{x^8 + 2x^3 - 4x^2}{2x^4 - 7x^2} \right]$. Circle one of the following answers:

(a) $1/2$

(b) $-1/2$

(c) ∞

(d) $-\infty$

(e) NONE OF THE ABOVE

B. (5 pts) (no partial credit) Compute $[d/dx][(\sin x)e^x]$. Circle one of the following answers:

(a) $(\cos x)(xe^{x-1})$

(b) $(\cos x)e^x$

(c) $(\cos x)e^x + (\sin x)e^x$

(d) $(\cos x)e^x + (\sin x)(xe^{x-1})$

(e) NONE OF THE ABOVE

C. (5 pts) (no partial credit) Which is the intuitive definition of $\lim_{x \to 8^+} (H(x)) = \infty$? Circle one of the following answers:

(a) If $H(x)$ is very positive, then x is close to 8.

(b) If x is close to 8, then $H(x)$ is very positive.

(c) If x is close to 8, but greater than 8, then $H(x)$ is very positive.

(d) If x is close to 8, but not equal to 8, then $H(x)$ is very positive.

(e) NONE OF THE ABOVE

D. (5 pts) (no partial credit) Compute $[d/dx][3x^4 + 2x^{1/2} + \pi]$. Circle one of the following answers:

(a) $4x^3 + x^{-1/2}$

(b) $12x^3 + x^{-1/2}$

(c) $12x^3 + x^{1/2} + \pi$

(d) $3x^3 + x^{1/2} + \pi$

(e) NONE OF THE ABOVE

E. (5 pts) (no partial credit) What is the smallest number x such that $|x - 3| \leq 0.002$? Circle one of the following answers:

(a) -2.998

(b) 3

(c) 3.002

(d) 2.998

(e) NONE OF THE ABOVE

F. (5 pts) (no partial credit) Compute $[d/dx][2e^x + 5\pi]$. Circle one of the following answers:

(a) $2e^x + 5$

(b) $2xe^{x-1} + 5$

(c) $2e^x + 5\pi$

(d) $2xe^{x-1} + 5\pi$

(e) NONE OF THE ABOVE

II. True or false (no partial credit):

a. (5 pts) $\dfrac{d}{dx}\left[\dfrac{\sin x}{x^2}\right] = \dfrac{\cos x}{2x}$.

b. (5 pts) If f is a polynomial of degree 7, then f'' is a polynomial of degree 5.

c. (5 pts) $\lim\limits_{x\to 0} \dfrac{\sin^2 x}{x^2} = 1$.

d. (5 pts) If two functions have the same derivative, then they must be equal.

e. (5 pts) If f and g are continuous at 3, then f^2g^3 MUST be continuous at 3 as well.

THE BOTTOM OF THIS PAGE IS FOR TOTALING SCORES
PLEASE DO NOT WRITE BELOW THE LINE

VERSION D

I. A,B,C

I. D,E,F

II. a,b,c,d,e

III. 1

III. 2

III. 3

III. 4

III. Computations. Show work. Unless otherwise specified, answers must be exactly correct, but can be left in any form easily calculated on a standard calculator.

1. (10 pts) Compute

$$\frac{d}{dx}\left(\left[\frac{x^2}{1+e^x}\right][5+\sin x]\right).$$

2. (15 pts) Compute $\lim_{n\to\infty}\left(1+\frac{0.05}{n}\right)^n$.

3. (10 pts) Find all horizontal asymptotes to

$$y = \frac{\sqrt{4x^6 + 4x + 4}}{9x^3 + 4}.$$

(NOTE: A horizontal asymptote is a line; your answers should be equations of lines, **NOT** numbers.)

4. (10 pts) Suppose $f(0) = 4$ and $f'(0) = 7$. Suppose $g(0) = 3$ and $g'(0) = 5$. Let $h = fg$. Compute $h(0)$ and $h'(0)$.