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.

SOLUTIONS Version B

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:

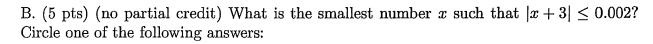
I. Multiple choice

A. (5 pts) (no partial credit) Compute $\lim_{x\to 0} \left[\frac{x^5 + 2x^3 + 4x^2}{-2x^4 - 7x^2} \right]$. Circle one of the following answers:



(b)
$$-1/2$$

$$(d)$$
 $-4/7$



-3-0.002

- (a) -2.998
- (b) 3
- (c) -3.002
- (d) 2.998
- (e) NONE OF THE ABOVE

C. (5 pts) (no partial credit) Which is the intuitive definition of $\lim_{x\to 8} (H(x)) = 4$? Circle one of the following answers:

- (a) If x is close to 8, but not equal to 8, then H(x) is close to 4.
 - (b) If x is close to 8, then H(x) is close to 4.
- (c) If x is close to 8, but not equal to 8, then H(x) is close to 4, but not equal to 4.
- (d) If x is close to 8, then H(x) is close to 4, but not equal to 4.
- (e) NONE OF THE ABOVE

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

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

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(b)
$$2e^x + 5e$$

 $2e^{x}+0$

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

- (d) $2xe^{x-1}$
- (e)NONE OF THE ABOVE

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

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

$$12x^3 + x^{-1/2} - 0$$

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

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

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

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

(a)
$$(\cos x)(-\sin x)$$

(b)
$$(\cos x)(\sin x)$$

$$(\cos x)(\cos x) + (\sin x)(-\sin x)$$

(c)
$$(\sin^2 x) - (\cos^2 x)$$

$$\widehat{(\mathrm{d})}(\cos^2 x) - (\sin^2 x)$$

(e) NONE OF THE ABOVE

- II. True or false (no partial credit):
- a. (5 pts) If f is a polynomial of degree 7, then f'' is a polynomial of degree 5.

b. (5 pts)
$$\lim_{x\to 0} \frac{\sin x}{x} = 1$$
.

c. (5 pts)
$$\frac{d}{dx} [(\sin x)(x^2)] = (\cos x)(2x)$$
.

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 fg MUST be continuous at 3 as well.

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

VERSION B

- 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

$$\frac{d}{dx} \left[\frac{(x^3+4)(\tan x)}{1-e^x} \right].$$

 $\frac{\left[1-e^{x}\right]\left[\left(3x^{2}\right)\left(\tan x\right)+\left(x^{3}+4\right)\left(\sec^{2}x\right)\right]-\left[\left(x^{3}+4\right)\left(\tan x\right)\right]\left[-e^{x}\right]}{\left[1-e^{x}\right]^{2}}$

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

$$\lim_{\chi\to\infty} \left[\left(1 + \frac{1}{\chi}\right)^{(-0.05)\chi} \right]$$

$$\lim_{\chi\to\infty} \left[\left(1 + \frac{1}{\chi}\right)^{(-0.05)\chi} \right]$$

$$\lim_{\chi\to\infty} \left[\left(1 + \frac{1}{\chi}\right)^{(-0.05)\chi} \right]$$

3. (10 pts) Find all horizontal asymptotes to

$$y = \frac{\sqrt{4x^2 - 2x + 7}}{2x^2 - 3} = \frac{1}{2} \left(\frac{1}{x} \right)$$

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

$$\lim_{x \to \pm \infty} f(x) = \lim_{x \to \pm \infty} \frac{\sqrt{4x^2}}{2x^2} = \lim_{x \to \pm \infty} \frac{|2x|}{2x^2}$$

$$= \lim_{x \to \pm \infty} \frac{\pm 2x}{2x^2} = 0$$

$$y=0$$

4. (10 pts) Suppose f(0) = 3 and f'(0) = 4. Suppose g(0) = 5 and g'(0) = 6. Let h = fg. Compute h(0) and h'(0).

$$h = fg$$

$$h' = f'g + fg'$$

$$h(0) = 3.5 = 15$$

$$h(0) = 4.5 + 3.6 = 20 + 18 = 38$$