

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 $\lim_{x \rightarrow 0} \left[\frac{x^5 + 2x^3 + 4x^2}{-2x^4 - 7x^2} \right]$. Circle one of the following answers:

- (a) $1/2$
 - (b) $-1/2$
 - (c) $4/7$
 - (d) $-4/7$
 - (e) NONE OF THE ABOVE
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B. (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
-

C. (5 pts) (no partial credit) Which is the intuitive definition of $\lim_{x \rightarrow 8} (H(x)) = 4$? 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) $2xe^{x-1} + 5e$

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

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

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

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

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

(e) NONE OF THE ABOVE

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

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

(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) $\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$.

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.

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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

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

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

3. (10 pts) Find all horizontal asymptotes to

$$y = \frac{\sqrt{4x^2 - 2x + 7}}{2x^2 - 3}.$$

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

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 $h'(0)$.