

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 $[d/dx][3x^4 + 4x^{1/2} - \pi]$. Circle one of the following answers:

- (a) $4x^3 + 2x^{-1/2}$
 - (b) $12x^3 + 2x^{-1/2}$
 - (c) $12x^3 + 2x^{1/2} - \pi$
 - (d) $3x^3 + 2x^{1/2} - \pi$
 - (e) NONE OF THE ABOVE
-

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

- (a) $(\cos x)(\sec x)(\tan x)$
 - (b) $(\cos x)(\sec^2 x)$
 - (c) $(\cos x)(\tan x) - (\sin x)(\sec^2 x)$
 - (d) $(\cos x)(\tan x) + (\sin x)(\sec x)(\tan x)$
 - (e) NONE OF THE ABOVE
-

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

- (a) $2e^x + 5$
- (b) $2e^x$
- (c) $2xe^{x-1} + 5$
- (d) $2xe^{x-1}$
- (e) NONE OF THE ABOVE

D. (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 $H(x)$ is close to 8, then x is close to 4.
 - (b) If x is close to 8, but less than 8, then $H(x)$ is close to 4.
 - (c) If $H(x)$ is close to 4, then x is close to 8, but greater than 8.
 - (d) If x is close to 8, but not equal to 8, then $H(x)$ is close to 4, but not equal to 4.
 - (e) NONE OF THE ABOVE
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E. (5 pts) (no partial credit) Compute $\lim_{x \rightarrow -\infty} \left[\frac{x^4 + 2x^3 - 4x^2}{2x^4 - 7x^2} \right]$. Circle one of the following answers:

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

F. (5 pts) (no partial credit) What is the largest 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
-

II. True or false (no partial credit):

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

b. (5 pts) $\frac{d}{dx} (3[f(x)] - 2[g(x)]) = 3[f'(x)] - 2[g'(x)]$.

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

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

e. (5 pts) $\lim_{x \rightarrow 0} \frac{(\cos x) - 1}{x} = 1$.

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

VERSION C

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

$$\frac{d}{dx} \left[\frac{(x^5 + 3x)(\cot x)}{2 + e^x} \right].$$

2. (15 pts) Compute $\lim_{n \rightarrow \infty} \left(1 - \frac{0.045}{n}\right)^n$.

3. (10 pts) Find all horizontal asymptotes to

$$y = \frac{\sqrt{x^4 + 4x - 7}}{3x^2 + 5}.$$

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

4. (10 pts) Suppose $f(0) = 5$ and $f'(0) = 4$. Suppose $g(0) = 2$ and $g'(0) = 3$. Let $h = fg$. Compute $h(0)$ and $h'(0)$.