

MATH 1271 Spring 2013, Midterm #1
Handout date: Thursday 21 February 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) (no partial credit) A line passes through $(1, 40)$ and $(5, 80)$. Find its slope. Circle one of the following answers:

- (a) 0
 - (b) 10
 - (c) -10
 - (d) 40
 - (e) NONE OF THE ABOVE
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B. (5 pts) (no partial credit) What is the smallest number x such that $|x - 3| \leq 0.005$?

- (a) -2.995
 - (b) 3
 - (c) 2.995
 - (d) 3.005
 - (e) NONE OF THE ABOVE
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C. (5 pts) (no partial credit) Compute $\lim_{x \rightarrow -\infty} \left[\frac{x^3 + 2x^2 - 4x}{2x^3 - 7x^2} \right]$ Circle one of the following answers:

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

D. (5 pts) (no partial credit) Which is the intuitive definition of $\lim_{x \rightarrow 4^-} (h(x)) = 7$? Circle one of the following answers:

- (a) If x is close to 4, but not equal to 4, then $h(x)$ is close to 7, but not equal to 7.
 - (b) If x is close to 4, but greater than 4, then $h(x)$ is close to 7.
 - (c) If $h(x)$ is close to 7, but not equal to 7, then x is close to 4, but less than 4.
 - (d) If $h(x)$ is close to 4, then x is close to 7.
 - (e) NONE OF THE ABOVE
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E. (5 pts) (no partial credit) Compute $\lim_{t \rightarrow 3} \left[\frac{t^2 + t - 12}{t - 3} \right]$. Circle one of the following answers:

- (a) 8
 - (b) 7
 - (c) 6
 - (d) 5
 - (e) NONE OF THE ABOVE
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F. (5 pts) (no partial credit) Compute $\lim_{x \rightarrow 0} \left[\frac{(8x^5 + 3x^4)(\cos x)}{4x^3(\sin x)} \right]$. Circle one of the following answers:

- (a) $3/4$
 - (b) -2
 - (c) 0
 - (d) This limit does not exist.
 - (e) NONE OF THE ABOVE
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II. True or false (no partial credit):

a. (5 pts) Let f be any function. If f is continuous at 3, then 3 is in the domain of f .

b. (5 pts) Let f be any algebraic function. If $\lim_{x \rightarrow \infty} f(x) = 1/3$, then $\lim_{x \rightarrow -\infty} f(x) = 1/3$.

c. (5 pts) Let $f(x) = |x|$. Then $f(x)$ is differentiable at $x = -1$.

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

e. (5 pts) Let f be the restriction of \sin to $[\pi/3, \pi/2]$. Then f is a one-to-one function.

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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) Find all horizontal asymptotes to

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

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

2. (15 pts) Compute $\lim_{n \rightarrow \infty} \left(1 + \frac{97}{n}\right)^n$.

3. (10 pts) Compute $\lim_{x \rightarrow \infty} \left[\frac{3x^2 + \sin^2 x}{4x^2 + 2} \right]$.

4. (10 pts) Let $f(x) = (x + 2)^4(x - 1)^6(x - 3)^7$. Find all of the maximum intervals of positivity and negativity for f .