

Practice Midterm # 2, Math 1A, Fall 2005
V. Jones

YOUR NAME:

YOUR TA's NAME:

YOUR SECTION NUMBER:

There are two parts.

PART I is multiple choice and contains 2 problems. Each of these problems is worth 2 points for a total of 4 points possible. No partial credit.

PART II has 5 problems. You must **show** your **work** to get full credit on these problems.

No calculators, or books but a one-sided "cheat-sheet page" is allowed.

Do all work on the exam, use back pages if you need more space.

PART I:

PART II:

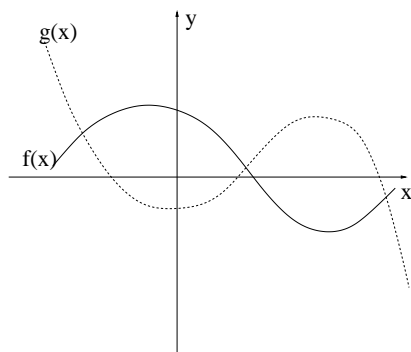
TOTAL:

Circle the MOST CORRECT answers for PART I

PART I

(multiple choice)

1. The function f is differentiable everywhere and so is its derivative f' . It satisfies $f(0) = 0$, $f''(0) < 0$ and $f(1) = 1$. Which of the following is necessarily true?
 - (a) There is a c with $0 < c < 1$ such that $f'(c) > 1$.
 - (b) There is a c with $0 < c < 1$ such that $f''(c) > 0$.
 - (c) There is a c with $0 < c < 1$ such that $f(c) > 1$.
 - (d) There is a c with $0 < c < 1$ such that $f''(c) < -1$.
 - (e) There is a c with $0 < c \leq 1$ such that $f'(c) = 0$.
 - (f) There is a c with $0 < c \leq 1$ such that $f''(c) = 0$.
2. Let $f(x)$ and $g(x)$ be functions whose graphs are sketched below (the graph of $g(x)$ is the dotted curve). Which of the following could be a relation between f and g ?



- (a) $f(x) = g(x) + 1$
- (b) $f(x) = g(x) - 1$
- (c) $f''(x) = g(x)$
- (d) $g''(x) = f(x)$
- (e) $f'(x) = g(x)$
- (f) $g'(x) = f(x)$

PART II

1. (3 points - each answer right or wrong-no partial credit)
(i) Find an antiderivative of $1 + \ln x$
(ii) Differentiate with respect to x :

$$e^{\frac{dy}{dx}}$$

(iii) Differentiate: $f(x) = (\sinh x)^{\frac{1}{x}}$

2. (3 points - each answer right or wrong-no partial credit) Evaluate the limits

(i) $\lim_{x \rightarrow 2} \frac{x^2 - 4}{x^2 + x - 2}$

(ii) $\lim_{x \rightarrow \pi/2^-} (x^2 - \pi^2/4) \tan x$

(iii) $\lim_{x \rightarrow 0^+} (\sin x)^x$

3. (3 points) Use linearization to find an approximation to $e^{(\ln 2)^{+.01}}$. Is this an overestimate or an underestimate of the actual value?

4. (3 points) Let $f(x)$ be the function whose domain is $[0, 4]$ and is defined

$$\text{by: } f(x) = \begin{cases} 2x & \text{for } 0 \leq x \leq 1 \\ x^2 - 4x + 5 & \text{for } 1 \leq x \leq 3 \\ x - 1 & \text{for } 3 \leq x \leq 4 \end{cases}$$

If your answer to this problem is x , your score will be $f(x)$, (fractions will be rounded down to the largest whole number less than $f(x)$).

5. (3 points) Sketch the curve $y = x^2 \ln x$