MATH 1A - MID TERM 1 - FALL 2001 - SARASON

Mathematics 1A, Section 2 **September 28, 2001**
Sarason

MIDTERM EXAMINATION

Name (Printed): _____

Signature: _____

SID Number: _____

GSI's Name: _____

Section Time: _____

TOTAL GRADE POINTS	

Closed Book. No Calculators.

Put your name on every page.

SHOW YOUR WORK. Cross out anything you have written that you do not want the grader to consider.

The points for each problem are in parentheses. Perfect score = 80.

1. (10) Find the numerical values of the following expressions.

   (a) $\tan\left(\sin^{-1}\frac{1}{2}\right)$

   (b) $\ln(\sqrt{e^{15}})$

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2. (20) Let $f(x) = \sqrt{x^2 - 1}$.

   (a) What is the domain of f?

   (b) What is the range of f?

   (c) Find f'.

   (d) Find $\lim_{x \to \infty} f'(x)$.

3. (5) Find all points on the curve $y = e^{3x} - 6e^{2x} + 9e^x$ where the tangent line is horizontal.

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4. (15) Evaluate the limits:

(a) $\lim_{x \to 0} \frac{1}{x}\left(\frac{1}{x+2} + \frac{1}{x-2}\right)$

(b) $\lim_{x \to 0} \cos\left(\frac{\sin \pi x}{x}\right)$

(c) $\lim_{x \to \infty} x(x - \sqrt{x^2 - 1})$

5. (25) In each part, find f' for the given function f.

(a) $f(x) = \left(e^{\sqrt{x}}\right)^2$

(b) $f(x) = (x^3 + x^{-3})^3$

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(c) $f(x) = \sin^5 x \cos x + \sin x \cos^3 x$

(d) $f(x) = x \tan x - \ln(\sec x)$

(e) $f(x) = x(\ln x)^2 - 2x \ln x + 2x$

6. (5) Suppose the functions f and g are inverses of each other, that f and g are differentiable to second order, and that $f(0) = 0$, $f'(0) = 2$, $f''(0) = 1$. What is $g''(0)$?