August 28, 2007

Lab 1: Calculus I review

TEAM MEMBERS

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INSTRUCTIONS: Work the following problems with your teammate. Write up your solutions neatly, clearly and carefully.

Part I: The basics
Fill in the following table.

$f(x)$	$f'(x)$	$\int f(x)\,dx$
0		
1		
x		
$x^n\ (n \neq -1)$		
$1/x$		$\times$
$\sin x$		
$\cos x$		
$\tan x$		$\times$
$\sec x$		$\times$
$\csc x$		$\times$
$\cot x$		$\times$
$\sec^2 x$	$\times$	
$\csc^2 x$	$\times$	
$\sec x \tan x$	$\times$	
$\csc x \cot x$	$\times$	

Part II: Limits

Evaluate the following limits.

1. $\lim_{x \to 3} \dfrac{x^2 - 9}{(x-3)^2}$

2. $\lim_{x \to 3} \dfrac{x^2 - 9}{x^2 - 4x + 3}$

3. $\lim_{x \to \infty} \dfrac{4x^2 + 3x + 2}{2x^2 + x - 1}$

Part III: Derivatives

Compute the derivatives of the following functions. You do not have to simplify your answers.

1. $y = 3 + x^2 + \dfrac{1}{\sqrt[3]{x^2}}$

2. $f(x) = \dfrac{x}{1 - x^2}$

3. $g(x) = \cos(x^2 + 1)$

4. $h(x) = x \tan(x)$

Part IV: Integrals

Evaluate the following integrals. You do not have to simplify your answers.

1. $\int (3 + x^2 + \frac{1}{\sqrt[3]{x^2}})\, dx$

2. $\int 2x \sin(x^2 + 3)\, dx$

3. $\int \cos\theta \sin^6\theta\, d\theta$

4. $\int_0^2 \frac{dx}{(2x+3)^2}$