Math 126 General Study Guide for Exam I Block 3 Tinsley

General Instructions:

You will have three hours to complete the exam. It will be in two parts. For both parts you are allowed one 3"x5" index card on which anything may be written (front and back). On Part I, you many use no electronic aid such as a calculator. On Part II, you may use a calculator but no other materials. I have listed those ideas, techniques, and methods that I will expect you to be able to apply.

Definitions:

function *f*	domain and range of *f*	derivative of *f(x)*
Slope of a secant	slope of a curve	average velocity
velocity	acceleration	second derivative of *f(x)*
exponential function	logarithmic function	limit (working defn)
equation of a tangent line	inverse function f^{-1}	

Derivative Formulas:

limit definition	y = c	y = x
coefficient rule	power rule	sum rule
product rule	quotient rule	chain rule
implicit differentiation	ln(x), e^x	sin(x), cos(x), tan(x)
$\sin^{-1}(x)$, $\tan^{-1}(x)$		

Graph Shapes:

ln(x), e^x	sin(x), cos(x), tan(x)	$\sin^{-1}(x)$, $\tan^{-1}(x)$

Function Values:

Know trig function values for x = 0, π/6, π/4, π/3, π/2 and angles with these as reference angles.

Analogously, $sin^{-1}(x)$ for $x = 0, \frac{1}{2}, \frac{\sqrt{2}}{2}, \frac{\sqrt{3}}{2}, 1$ and $tan^{-1}(x)$ for $x = 0, \frac{1}{\sqrt{3}}, 1, \sqrt{3}$.

Theoretical Notions:

numerical functions	definition of derivatives	inverses of functions
numerical derivatives	derivative function	shapes of curves
graphs of functions	$\lim_{x \to 0} \frac{sin(x)}{x} = 1$	**product rule for derivatives**

Problem Guarantees:

Calculation of $f'(x)$ directly from the limit definition

Computations of derivatives using a variety of rules

Implicit differentiation

Related rate problem

Either (1) the derivation of $\lim_{x \to 0} \frac{sin(x)}{x} = 1$ or (2) the derivation of the product rule for derivatives.