Exam II Study Guide

Exam II (5:15-7pm, Thursday March 26, 2020) is based on Sections 3.2–3.10 of the textbook. The following skills are considered important preparation for the Exam.

Problem Type	**Examples in the Text**
Differentiate functions using the following rules: • Constant multiple rule • Sum rule • Power rule • Product rule, including products of 3 or more functions • Quotient rule • Chain rule • Functions involving a combination of these rules	§3.3: 19–40, 46–58 §3.4: 19–25, 76–681 §3.7: 15–60
Differentiate the following types of functions: • Exponentials • Logarithms and functions of the form b^x where b is constant • Trigonometric functions and their inverses	§3.5: 11–51 §3.7: 32–58 §3.9: 15–48 §3.10: 13–40
Given the graph of a function $f(x)$, identify: • Values of x where f is not continuous • Values of x where f is not differentiable • Values of x where $f'(x) = 0$	§3.2: 53, 54
Given an equation involving x and y that defines a curve in the (x, y)-plane, • Show that a given point $(x, y) = (a, b)$ lies on the curve. • Use implicit differentiation to find dy/dx. • Find the equation of a line tangent to the curve at (a, b)	§3.8: 13–20; 45–50
Correctly interpret $f'(x)$ as (a) the rate of change of f with respect to x and (b) the slope of the line tangent to the graph of f at x	§3.6: 1–10
Given an object's position $s(t)$ as a function of time, determine its velocity $s'(t)$ and acceleration $s''(t)$.	§3.6: 15–20

The table shown on the right will appear on the last page of the exam.

$f(u)$	$f'(u)$
$\tan u$	$\sec^2 u$
$\cot u$	$-\csc^2 u$
$\sec u$	$\sec u \tan u$
$\csc u$	$-\csc u \cot u$
$\ln g(u)$	$g'(u)/g(u)$
$\log_b u$	$1/(u \ln b)$
$\sin^{-1} u$	$1/\sqrt{1-u^2}$
$\tan^{-1} u$	$1/(1+u^2)$
$\sec^{-1} u$	$1/(\lvert u\rvert\sqrt{u^2-1})$
$\cos^{-1} u$	$-1/\sqrt{1-u^2}$
$\cot^{-1} u$	$-1/(1+u^2)$
$\csc^{-1} u$	$-1/(\lvert u\rvert\sqrt{u^2-1})$

Chain rule: $(f \circ g)'(x) = f'(g(x))g'(x)$