

LSU Dual Enrollment Program for Math

Math 1530 Differential Calculus COURSE PROFILE 7-13-2022

LA BOARD OF REGENTS COMMON COURSE NUMBER: CMAT 2113 Differential Calculus

ETEXT: *Calculus: Early Transcendentals, 3e, MyLab Math, Briggs, Cochran, Gillett, Schultz*

HIGH SCHOOL COURSE CODE: 160498

CHAPTERS

2 – Limits

3 – Derivatives

4 – Applications of the Derivative

The number in parentheses indicates the number of homework exercises on that topic in MyLab Math.

Chapter 2: Limits

Section 2.1 The Idea of Limits (11)

Apply concepts related to limits

Calculate average and instantaneous velocity

Calculate slopes of secant and tangent lines

Section 2.2 Definitions of Limits (20)

Apply limit definitions

Find limits from a graph

Estimate limits from a table

Study limits for particular well-known functions

Section 2.3 Techniques for Computing Limits (32)

Apply techniques for computing limits

Apply limit laws

Evaluate limits

Evaluate one-sided limits

Use the Sandwich Theorem

Section 2.4 Infinite Limits (23)

Apply properties of infinite limits

Find infinite limits numerically or graphically

Evaluate limits analytically

Find vertical asymptotes

Section 2.5 Limits at Infinity (27)

Apply concepts relating to end behavior and horizontal asymptotes

Evaluate limits at infinity

Find horizontal asymptotes of rational functions

Determine end behavior and sketch graphs

Find horizontal and vertical asymptotes

Use limits to find steady states in applications

Find limits of sequences

Section 2.6 Continuity (32)

Apply the concept of continuity

Find points of discontinuity or intervals of continuity

Determine whether a function is continuous at a point using the continuity checklist

Evaluate limits using principles of continuity

Use the Intermediate Value Theorem

Classify discontinuities

Chapter 3: Derivatives

Section 3.1 Introducing the Derivative (19)

Review the concept of the derivative

Use limit definitions to find equations of tangent lines.

Understand differentiability and relate it to continuity

Understand derivatives graphically

Solve applications involving basic derivatives

Section 3.2 Working with Derivatives (16)

Apply concepts related to working with derivatives

Work with the graph of the derivative of a function

Find derivatives of functions using limits

Determine continuity and differentiability and evaluate derivatives

Understand differentiability and relate it to continuity

Section 3.3 Rules of Differentiation (28)

Use graphs and tables to find derivatives

Find derivatives using rules of differentiation

Simplify products and quotients and find their derivatives

Use derivatives to find slope locations and equations of tangent lines

Find higher-order derivatives of functions

Find limits related to derivatives

Section 3.4 The Product and Quotient Rules (25)

Find derivatives of products and quotients of algebraic expressions

Find derivatives using two different methods

Find derivatives using the extended power rule

Find higher order derivatives of products and quotients

Find derivatives of products and quotients using given values or graphs

Find equations of tangent lines

Section 3.5 Derivatives of Trigonometric Functions (22)

Find derivatives of basic trigonometric functions

Find limits involving trigonometric functions

Find derivatives of products, quotients, and powers of functions with trigonometric expressions.

Find higher order derivatives of functions involving trigonometric expressions

Verify statements involving trigonometric expressions

Find equations of tangent lines

Section 3.6 Derivatives as Rates of Change (14)

Apply concepts related to derivatives as rates of change

Relate position, velocity, and acceleration to derivatives

Solve other applications involving derivatives as rates of change

Section 3.7 The Chain Rule (27)

Apply properties of the chain rule

Find derivatives using the chain rule

Find equations of tangent lines

Section 3.8 Implicit Differentiation (21)

Apply the concept of implicit differentiation

Find derivatives using implicit differentiation

Find equations of tangent lines using implicit differentiation

Find derivatives of functions with rational exponents

Find tangent and normal lines

Solve applications using implicit differentiation

Section 3.9 Derivatives of Logarithmic and Exponential Functions (31)

Find derivatives involving logarithms and exponential

Find derivatives using logarithmic differentiation

Evaluate limits of logarithmic and exponential functions using the definition of the derivative

Section 3.10 Derivatives of Inverse Trig Functions (22)

Apply concepts relating to the derivatives of inverse trigonometric functions

Find derivatives of functions involving inverse trigonometric functions

Find equations of tangent lines

Find derivatives of general inverse functions

Solve applications involving the rate of change of an angle with respect to a side

Section 3.11 Related Rates (20)

Solve related rates problems involving geometry

Solve related rates applications for the rate of change of distance, area, or volume

Solve related rates applications for the rate of change of an angle

Chapter 4: Applications of the Derivative

Section 4.1 Maxima and Minima (28)

Apply concepts related to maxima and minima

Use graphs to illustrate or identify extreme points

Find critical points and extreme points

Solve applications involving extreme points

Section 4.3a What Derivatives Tell Us (16)

Find intervals on which a function is increasing and decreasing

Use the first derivative test to find local and absolute extrema

Section 4.3b What Derivatives Tell Us (16)

Sketch functions from properties

Determine the concavity on intervals and find inflection points

Use the second derivative test to find local extrema

Compare f , f' , and f''

Section 4.4 Graphing Functions (14)

Sketch functions using analytic methods

Graph functions, and find any local extrema and inflection points

Sketch the general graph of functions given the equation of the derivatives