LSU Dual Enrollment Program for Math
Math 1540 Integral Calculus COURSE PROFILE 10-2-2023

LA BOARD OF REGENTS COMMON COURSE NUMBER: CMAT 2116 Integral Calculus
ETEXT: *Calculus: Early Transcendentals, 3e, MyLab Math*, Briggs, Cochran, Gillett, Schultz
HIGH SCHOOL COURSE CODE: 160499

CHAPTERS
4 – Applications of the Derivative
5 – Integration
6 – Applications of Integration

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

Chapter 4: Applications of the Derivative

Section 4.2 Mean Value Theorem (15)

Apply properties of Rolle's Theorem and the Mean Value Theorem
Find points guaranteed to exist by Rolle's Theorem
Find points guaranteed to exist by the Mean Value Theorem
Solve applications using the Mean Value Theorem

Section 4.5 Optimization Problems (16)

Apply properties of optimization problems and objective functions
Solve optimization problems involving geometry, number operations, and conic sections
Solve applications by optimizing functions

Section 4.6 Linear Approximations and Differentials (25)

Write a linear approximation and estimate the value of a function
Graph a function and its linear approximation to identify underestimates and overestimates
Use linear approximations to estimate a quantity
Use linear approximations to estimate changes in a given variable
Write a differential expression the change in y as a function of the change in x

Section 4.7 L'Hopital's Rule (26)

Evaluate limits of the form $0/0$
Evaluate limits of the form ∞/∞, $0\cdot\infty$, or $\infty-\infty$
Evaluate limits of the form 1^{∞}, 0^{0}, or ∞^{0}
Evaluate limits using the appropriate method

Section 4.8 Newton's Method (11)

Given an initial approximation, use Newton's method to find the first two approximations
Use Newton's method to find solutions to equations

Section 4.9 Antiderivatives (39)

Find general antiderivatives and indefinite integrals

Find particular antiderivatives and solve initial value problems
Relate solutions to initial value problems to their graphs
Solve applications involving antiderivatives
Find the equation of a curve given information about the derivative
Solve initial value problems

Chapter 5: Integration

Section 5.1 Approximating Areas under Curves (27)

Apply properties of Riemann sums
Approximate displacement over an interval given a velocity function
Evaluate left, right, and midpoint Riemann sums
Evaluate Riemann sums from tables
Use sigma notation and evaluate expressions in sigma notation
Solve applications using the area under a curve

Section 5.2 Definite Integrals (23)

Apply properties of net area and definite integrals
Approximate net area given functions
Express Riemann sums as definite integrals
Evaluate definite integrals using geometry
Approximate net area from graphs
Use properties of definite integrals
Evaluate definite integrals using Riemann sums

Section 5.3 Fundamental Theorem of Calculus (28)

Apply properties of the Fundamental Theorem of Calculus
Evaluate area functions
Evaluate definite integrals using the Fundamental Theorem of Calculus
Find areas bounded by functions
Evaluate derivatives of definite integrals
Work with area functions and graphs of area functions

Section 5.4 Working with Integrals (15)

Use symmetry to evaluate definite integrals
Find average values of functions over given intervals
Use the Mean Value Theorem for Integrals
Find average values of functions

Section 5.5 Substitution Rule (45)

Verify formulas using differentiation
Apply properties of composite functions and the Substitution Rule
Find indefinite integrals using a given substitution
Use a change of variables to find indefinite integrals
Use a change of variables to evaluate definite integrals
Find general antiderivatives and indefinite integrals
Find areas of regions using integration that requires substitution
Evaluate definite integrals using the Fundamental Theorem of Calculus

Find particular antiderivatives and solve initial value problems
Find average values of functions over given intervals

Chapter 6: Applications of Integration

Section 6.1 Velocity and Net Change (20)

Apply properties of velocity and net change
Determine displacement and position from velocity
Find position and velocity from acceleration
Solve applications involving net change and future value

Section 6.2 Regions Between Curves (15)

Apply concepts associated with the area between two curves
Find the area between two curves
Rewrite areas by changing the variable of integration

Section 6.3 Volumes by Slicing (21)

Apply concepts associated with finding volumes by slicing
Use the general slicing method to find volumes of solids
Use the disk method to find volumes of solids
Use the washer method to find volumes of solids
Find volumes of solids using an appropriate method
Compare volumes of solids

Section 6.4 Volume by Shells (17)

Use the shell method to find volumes of solids generated by revolving a region about the y-axis
Use the shell method to find volumes of solids generated by revolving a region about the x-axis
Use the shell method to find volumes of solids
Find volumes of solids using an appropriate method

Section 6.5 Length of Curves (9)

Find arc lengths by integrating with respect to x
Solve applications involving arc length

Section 6.7 Density and Mass (12)

Apply concepts associated with mass, work, and force
Find the mass of thin bars with given density functions
Solve applications involving work
Solve applications involving force