Advanced Placement® (AP®) Calculus (APCALC) B Syllabus

Course Name

APCALC B

Advanced Placement® (AP®) Calculus – Semester B

Course Information

APCALC B is the second semester of this two-semester course.

In AP Calculus A and B, students learn to understand change geometrically and visually (by studying graphs of curves), analytically (by studying and working with mathematical formulas), numerically (by seeing patterns in sets of numbers), and verbally. Instead of simply getting the right answer, students learn to evaluate the soundness of proposed solutions and to apply mathematical reasoning to real-world models. Calculus helps scientists, engineers, and financial analysts understand the complex relationships behind real-world phenomena. The equivalent of an introductory college-level calculus course, AP Calculus A and B prepare students for the AP exam and further studies in science, engineering, and mathematics.

Prerequisite: Algebra II, Geometry, and Pre-Calculus with Trigonometry

This course has been authorized by the College Board® to use the AP® designation.

**Advanced Placement® and AP® are registered trademarks and/or owned by the College Board®, which was not involved in the production of, and does not endorse this product.*

Course Delivery Method

Online

Contacting Your Instructor

You may contact your instructor through the Blackboard messaging system. Technical support is available 24/7 at www.k12.ttu.edu.

Course Objectives

After completing this course, you should be able to:

1. understand change geometrically and visually (by studying graphs of curves), analytically (by studying and working with mathematical formulas), numerically (by seeing patterns in sets of numbers), and verbally;
2. evaluate the soundness of proposed solutions;
3. apply mathematical reasoning to real-world models; and
4. understand the complex relationships behind real-world phenomena.

APCALC addresses the required Texas Essential Knowledge and Skills (TEKS). These can be found at the Texas Education Agency website.

Textbook and Materials

Textbook(s)

There is no required text to purchase for this course.

Materials

Required:

- TI-89, TI-84 Plus, TI-83, or TI-83 Plus calculator or equivalent

Optional:

- *Calculus: Single Variable*, 8th ed. James Stewart (Brooks/Cole, 2016). ISBN-10: 1305266633 / ISBN-13: 9781305266636
  Acceptable alternate: 7th ed. (2012). ISBN-10: 0538497831
  Acceptable alternate: 6th ed. (2008). ISBN-10: 0495011614
- *Cracking the AP Calculus AB Exam*, 2020 Edition. Princeton Review. (Penguin Random House, 2019). ISBN-10: 0525568158 / ISBN-13: 9780525568155
  Acceptable alternate: 2019 ed. ISBN-13:9781524757984
  Acceptable alternate: 2018 ed. ISBN-13:9781524710019

Technical Requirements

- Internet access – preferably high speed (for accessing Blackboard)
- Email
- Word processing software such as Microsoft Word
- Adobe Reader (download from Adobe.com)
- Audio and video capabilities (for watching/listening to course content)

continued →

Technical Skill Requirements

Be comfortable with the following:

- using a word processor
- Internet search engines and browsers

Course Organization

This course consists of five units and a final exam. Each unit contains the following:

- Introduction and Instructions
- Learning Objectives and Curriculum Standards
- Learning Activities
- Assignments

Each unit includes several activities that present content knowledge. Each unit also includes multiple graded assignments to ensure that you learn the content that has been presented in the activities. Some of the assignments are automatically-graded quizzes, and some are written assignments or activities that your instructor will grade. Be sure you read all instructions carefully and ask your instructor for help if something is not clear.

Course Outline

Please note that some assignments will be hidden from you when you start the course. As you move through the units and complete assignments, more will unlock for you.

Unit	Topic	Approximate Time for Completion
Unit 6	The Integral and the Fundamental Theorem of Calculus	Four weeks
Lesson 1	Area Under a Curve	
Lesson 2	Definite Integrals	
Lesson 3	Antiderivatives	
Lesson 4	The Fundamental Theorems of Calculus	
Lesson 5	Wrap-Up	
Unit 7	Applications of the Integral	Three weeks
Lesson 1	Area	
Lesson 2	Volume	

Unit	Topic	Approximate Time for Completion
Lesson 3	Other Applications of the Definite Integral	
Lesson 4	Wrap-Up	
Unit 8	Inverse and Transcendental Functions	Four weeks
Lesson 1	Inverse Functions	
Lesson 2	Review of Logarithmic and Exponential Functions	
Lesson 3	Computation of Derivatives for Some Transcendental Functions	
Lesson 4	Integrals of Some Transcendental Functions	
Lesson 5	Wrap-Up	
Unit 9	Separable Differential Equations and Slope Fields	Three weeks
Lesson 1	Separable Differential Equations	
Lesson 2	Exponential Growth and Decay and Related Applications	
Lesson 3	Wrap-Up	
Unit 10	Semester Review and Practice AP Exam	Three weeks
Lesson 1	Calculus as a Cohesive Whole	
Lesson 2	Review of Topics	
Lesson 3	Practice Final Exams	
Final Exam	Units 6-10	

Assignment Schedule

Each of the following must be completed to complete the course. Items with an asterisk (*) indicate that these are summative assessments for the course.

Unit	Weeks	Assignments
6	1-4	6.1.1 Discuss: Derivatives 6.1.5 Quiz: Practice Using Riemann Sums 6.1.6 Practice: Finding a Better Approximation of Area Under a Curve

Unit	Weeks	Assignments
		6.1.9 Quiz: An Alternative to Riemann Sums 6.2.4 Quiz: Practice With the Definite Integral 6.2.7 Quiz: Practice With Properties of the Definite Integral 6.2.9 Quiz: Practice Using fnInt()or nInt() 6.2.12 Practice: Practice With the Definite Integral as Accumulated Change 6.3.1 Discuss: Going Between Position, Velocity, and Acceleration 6.3.4 Quiz: Practice Finding Antiderivatives 6.3.7 Quiz: Practice Finding Antiderivatives of Composite Functions 6.4.1 Practice: Exploring the Relationship Between the Derivative and the Antiderivative 6.4.4 Quiz: Practice Using the Fundamental Theorems 6.4.8 Quiz: Terms and Concepts 6.4.11 Practice: Practice Analyzing Functions Defined by Definite Integrals *6.5.2 Test (CST): The Integral and the Fundamental Theorem of Calculus
7	5-7	7.1.3 Quiz: Practice Finding Area Between Curves 7.1.6 Quiz: Practice Finding Domains for Given Areas 7.1.7 Practice: More Practice with Areas 7.2.1 Discuss: Making a Solid 7.2.7 Practice: Practice With Many Kinds of Volumes 7.3.7 Quiz: Practice Using Definite Integrals 7.3.8 Practice: Practice Using Definite Integrals 7.3.9 Quiz: Important Concepts From This Unit *7.4.2 Test (CST): Applications of the Integral
8	8-11	8.1.3 Quiz: Derivatives of Inverse Functions 8.1.6 Quiz: Use Inverse Trig Functions and Identify Their Domain Restrictions 8.2.1 Discuss: What Makes Logarithms So Scary? 8.2.5 Quiz: Exponential and Logarithmic Functions 8.3.4 Quiz: Derivatives of Logarithmic and Exponential Functions 8.3.8 Quiz: Practicing Curve Analysis 8.3.9 Practice: Analysis of Curves 8.4.3 Quiz: Antiderivatives of Transcendental Functions 8.4.7 Practice: More Applications of Integrals *8.5.2 Test (CST): Inverse and Transcendental Functions

Unit	Weeks	Assignments
9	12-14	9.1.3 Quiz: Important Concepts From This Unit 9.1.6 Quiz: Setting up and Solving Separable Differential Equations 9.1.7 Practice: Applications of Differential Equations 9.2.3 Quiz: Solving Growth and Decay Problems 9.2.6 Practice: More Applications of Exponential and Logarithmic Differential Equations *9.3.2 Test (CST): Separable Differential Equations and Slope Fields
10	15-17	10.1.4 Discuss: Calculus as a Cohesive Whole 10.1.5 Practice: Goals for the AP Exam 10.2.1 Quiz: AP-Style Multiple-Choice Questions, Part 1 10.2.2 Quiz: AP-Style Multiple-Choice Questions, Part 2 10.2.3 Practice: AP-Style Free-Response Questions 10.3.4 Practice: Scoring Your Practice Exam 10.3.6 Discuss: Should You Take the AP Exam? 10.4.1 Exam: Final Exam (simulation)
		10.4.2 Final Exam: Final Exam

Course Detailed Description

UNIT 6: THE INTEGRAL AND THE FUNDAMENTAL THEOREM OF CALCULUS

LESSON 1 OVERVIEW: AREA UNDER A CURVE

6.1.1 Discuss: Derivatives
Write about the derivative, and summarize and discuss what you've learned about derivatives.
Duration: 30 mins; Scoring: 10 points

6.1.2 Practice: Analyzing Velocity and Distance in a Car Ride
In this activity take a ride, record information, and then use your data to make discoveries about how math can be used to explore velocity and distance.
Duration: 1 hr

6.1.3 Study: Area Under a Curve: Riemann Sums
Explore how to use rectangles to estimate the area under a curve.
Duration: 30 mins

6.1.4 Practice: Area Under a Curve: Riemann Sums
Explore how to use rectangles to estimate the area under a curve.
Duration: 30 mins

6.1.5 Quiz: Practice Using Riemann Sums
Practice estimating areas under curves by computing various Riemann sums using left-hand endpoints, right-hand endpoints, and midpoints.
Duration: 1 hr; Scoring: 6 points

6.1.6 Practice: Finding a Better Approximation of Area Under a Curve
Explore how to find a better approximation of area under a curve.
Duration: 45 mins; Scoring: 20 points

6.1.7 Study: Numerical Approximations to Area
Examine an alternative to Riemann sums.
Duration: 30 mins

6.1.8 Practice: Numerical Approximations to Area
Examine an alternative to Riemann sums.
Duration: 30 mins

6.1.9 Quiz: An Alternative to Riemann Sums
Apply the trapezoid rule and see that in some cases the approximation is very good, and in other cases it contains a lot of error.
Duration: 1 hr; Scoring: 7 points

6.1.10 Practice: Using Approximations to Area Under a Curve
Practice using approximations to area under a curve.
Duration: 1 hr

LESSON 2 OVERVIEW: DEFINITE INTEGRALS

6.2.1 Practice: What If You Take More Intervals?
Discover what happens if you take more intervals.
Duration: 1 hr

6.2.2 Study: The Definite Integral
Look at how to determine the exact area under the curve. Evaluate some definite integrals by applying simple rules of geometry, and approximate some definite integrals numerically.
Duration: 30 mins

6.2.3 Practice: The Definite Integral
Look at how to determine the exact area under the curve. Evaluate some definite integrals by applying simple rules of geometry, and approximate some definite integrals numerically.
Duration: 30 mins

6.2.4 Quiz: Practice With the Definite Integral
Practice with the definition of the definite integral and its relationship to area under curves.
Duration: 45 mins; Scoring: 7 points

6.2.5 Study: Properties of the Definite Integral
Definite integrals work like the areas in precalculus; they have similar algebraic properties when you combine them. This Tutorial examines the important properties of the definite integral.
Duration: 30 mins

6.2.6 Practice: Properties of the Definite Integral
Definite integrals work like the areas in precalculus; they have similar algebraic properties when you combine them. This Tutorial examines the important properties of the definite integral.
Duration: 30 mins

6.2.7 Quiz: Practice With Properties of the Definite Integral
Practice combining and working with properties of definite integrals. Use the notion of definite integral as “signed area.”
Duration: 45 mins; Scoring: 9 points

6.2.8 Practice: Finding the Value of a Definite Integral
Approximate definite integrals numerically.
Duration: 1 hr

6.2.9 Quiz: Practice Using fnInt()or nInt()
Use your graphing calculator to approximate definite integrals.

Duration: 30 mins; Scoring: 5 points

6.2.10 Study: The Definite Integral as Accumulated Change
The definite integral is more than just the area under the curve. In this Tutorial you'll look at the definite integral as an "accumulator."
Duration: 30 mins

6.2.11 Practice: The Definite Integral as Accumulated Change
The definite integral is more than just the area under the curve. In this Tutorial you'll look at the definite integral as an "accumulator."
Duration: 30 mins

6.2.12 Practice: Practice With the Definite Integral as Accumulated Change
Exercise your understanding about the definite integral as an accumulator of change and about the idea of average value of a function.
Duration: 1 hr; Scoring: 25 points

LESSON 3 OVERVIEW: ANTIDERIVATIVES

6.3.1 Discuss: Going Between Position, Velocity, and Acceleration
Given an equation for velocity, attempt to come up with an equation for position. And given an equation for acceleration attempt to come up with an equation for velocity.
Duration: 30 mins; Scoring: 10 points

6.3.2 Study: The Antiderivative
Study how, given a derivative, to find the "original" function.
Duration: 30 mins

6.3.3 Practice: The Antiderivative
Study how, given a derivative, to find the "original" function.
Duration: 30 mins

6.3.4 Quiz: Practice Finding Antiderivatives
Practice finding antiderivatives.
Duration: 1 hr; Scoring: 11 points

6.3.5 Study: Antiderivatives of Composite Functions
Examine how to find antiderivatives of composite functions.
Duration: 30 mins

6.3.6 Practice: Antiderivatives of Composite Functions
Examine how to find antiderivatives of composite functions.
Duration: 30 mins

6.3.7 Quiz: Practice Finding Antiderivatives of Composite Functions
Practice finding antiderivatives of composite functions.
Duration: 1 hr; Scoring: 11 points

6.3.8 Practice: Practice Finding Antiderivatives of Composite Functions
Apply your knowledge about finding antiderivatives of composite functions.
Duration: 1 hr

LESSON 4 OVERVIEW: THE FUNDAMENTAL THEOREMS OF CALCULUS

6.4.1 Practice: Exploring the Relationship Between the Derivative and the Antiderivative
In this activity, use your calculator to explore the relationship between the derivative and the antiderivative (or area function). See how the derivative and the antiderivative are related.
Duration: 30 mins; Scoring: 20 points

6.4.2 Study: The Fundamental Theorems of Calculus
Notice how the Fundamental Theorems of Calculus tie together into one neat package. Examine the shortcut for evaluating definite integrals exactly.
Duration: 30 mins

6.4.3 Practice: The Fundamental Theorems of Calculus
Notice how the Fundamental Theorems of Calculus tie together into one neat package. Examine the shortcut for evaluating definite integrals exactly.
Duration: 30 mins

6.4.4 Quiz: Practice Using the Fundamental Theorems
Develop a basic understanding of what the theorems mean and how to use them.
Duration: 45 mins; Scoring: 10 points

6.4.5 Study: Definite Integrals of Composite Functions
Apply the use of substitution to find antiderivatives to definite integrals and study about changing the limits of integration.
Duration: 30 mins

6.4.6 Practice: Definite Integrals of Composite Functions
Apply the use of substitution to find antiderivatives to definite integrals and study about changing the limits of integration.
Duration: 30 mins

6.4.7 Practice: Practice Using Substitution and the Fundamental Theorems
Practice using the method of substitution for evaluating definite integrals.
Duration: 1 hr

6.4.8 Quiz: Terms and Concepts
Examine the subtleties of terms and concepts related to the Fundamental Theorems and integration.
Duration: 30 mins; Scoring: 10 points

6.4.9 Study: Analyzing Functions Defined as Definite Integrals
Look at some functions given as definite integrals, and explore how to do calculus with them.
Duration: 30 mins

6.4.10 Practice: Analyzing Functions Defined as Definite Integrals
Look at some functions given as definite integrals, and explore how to do calculus with them.
Duration: 30 mins

6.4.11 Practice: Practice Analyzing Functions Defined by Definite Integrals
Find derivatives at points, and apply multiple applications on functions given as definite integrals.
Duration: 1 hr; Scoring: 30 points

LESSON 5 OVERVIEW: THE INTEGRAL AND THE FUNDAMENTAL THEOREM OF CALCULUS WRAP-UP

6.5.1 Review: The Integral and the Fundamental Theorem of Calculus
Review your studies of the area under a curve, definite integrals, antiderivatives, and the fundamental theorems of calculus.
Duration: 5 hrs

6.5.2 Test (CST): The Integral and the Fundamental Theorem of Calculus
Take a 25-minute test covering the area under a curve, definite integrals, antiderivatives, and the fundamental theorems of calculus.
Duration: 25 mins; Scoring: 20 points

UNIT 7: APPLICATIONS OF THE INTEGRAL

LESSON 1 OVERVIEW: AREA

7.1.1 Study: Area Between Curves
See how to use the definite integral to determine the area of just about any shape that can be defined with equations in terms of x and y.
Duration: 30 mins

7.1.2 Practice: Area Between Curves
See how to use the definite integral to determine the area of just about any shape that can be defined with equations in terms of x and y.
Duration: 30 mins

7.1.3 Quiz: Practice Finding Area Between Curves
Practice finding area between curves.
Duration: 45 mins; Scoring: 8 points

7.1.4 Study: More About Areas
See what else you can do with finding areas. Find areas in cases where there is no formula for the function, and analyze functions in cases where you're given an integral but not the original formula for the function.
Duration: 30 mins

7.1.5 Practice: More About Areas
See what else you can do with finding areas. Find areas in cases where there is no formula for the function, and analyze functions in cases where you're given an integral but not the original formula for the function.
Duration: 30 mins

7.1.6 Quiz: Practice Finding Domains for Given Areas
Work with the idea of the average value of a function. Some of the techniques will be the same as in the previous activity, where you found areas between curves.
Duration: 1 hr; Scoring: 10 points

7.1.7 Practice: More Practice with Areas
Practice applying definite integrals. Work with qualitative questions (not heavy on numbers and calculation).
Duration: 1 hr 15 mins; Scoring: 25 points

LESSON 2 OVERVIEW: VOLUME

7.2.1 Discuss: Making a Solid
In this activity, construct a three-dimensional solid out of cardboard.
Duration: 1 hr; Scoring: 10 points

7.2.2 Study: Volumes of Revolution
Examine three-dimensional shapes formed by rotating a curve and how to use the integral to find their volumes.
Duration: 30 mins

7.2.3 Practice: Volumes of Revolution
Examine three-dimensional shapes formed by rotating a curve and how to use the integral to find their volumes.
Duration: 30 mins

7.2.4 Practice: Practice Working With Volumes of Revolution
Find the volume of solids formed by rotating given regions around a certain line.
Duration: 1 hr

7.2.5 Study: Other Cross Sections
Investigate cross sections of solids.
Duration: 30 mins

7.2.6 Practice: Other Cross Sections
Investigate cross sections of solids.
Duration: 30 mins

7.2.7 Practice: Practice With Many Kinds of Volumes
Practice computing the volumes of solids whose cross sections are not circular or annular (washer-shaped).
Duration: 1 hr 30 mins; Scoring: 25 points

LESSON 3 OVERVIEW: OTHER APPLICATIONS OF THE DEFINITE INTEGRAL

7.3.1 Practice: Rectilinear Motion
Apply your knowledge of position, distance, velocity, speed, and acceleration in preparation for applying the definite integral to rectilinear motion (motion in a straight line).
Duration: 30 mins

7.3.2 Study: Rectilinear Motion Revisited
Use integrals to find net and total distances. Look at the distinction between speed and velocity, and see how these relate to the distinction between net and total distance.
Duration: 30 mins

7.3.3 Practice: Rectilinear Motion Revisited
Use integrals to find net and total distances. Look at the distinction between speed and velocity, and see how these relate to the distinction between net and total distance.
Duration: 30 mins

7.3.4 Practice: Practice Finding Distances, Velocities, and Other Aspects of Rectilinear Motion
Answer questions about the relationships between distance, velocity, and other aspects of rectilinear motion.
Duration: 1 hr

7.3.5 Study: Other Applications of the Definite Integral
Learn how these applications work in situations such as calculating arc length, work (force over a distance), and fluid pressure. Study about the connections between these applications.
Duration: 30 mins

7.3.6 Practice: Other Applications of the Definite Integral
Learn how these applications work in situations such as calculating arc length, work (force over a distance), and fluid pressure. Study about the connections between these applications.
Duration: 30 mins

7.3.7 Quiz: Practice Using Definite Integrals
Practice applying the definite integral. Underlying all these applications is the principle of accumulation.
Duration: 1 hr 15 mins; Scoring: 9 points

7.3.8 Practice: Practice Using Definite Integrals
Practice applying the definite integral to situations involving accumulation of quantities.
Duration: 1 hr 30 mins; Scoring: 30 points

7.3.9 Quiz: Important Concepts From This Unit
Review the meanings of some of the important terms and concepts in a series of qualitative (no math calculations) questions.
Duration: 1 hr 30 mins; Scoring: 8 points

LESSON 4 OVERVIEW: APPLICATIONS OF THE INTEGRAL WRAP-UP

7.4.1 Review: Applications of the Integral
Review concepts of area, volume, and other applications of the definite integral.
Duration: 5 hrs

7.4.2 Test (CST): Applications of the Integral
Take a 25-minute test covering various applications of the definite integral, including finding areas of regions and volume for solids and use the definite integral to solve problems of accumulation of change.
Duration: 25 mins; Scoring: 20 points

UNIT 8: INVERSE AND TRANSCENDENTAL FUNCTIONS

LESSON 1 OVERVIEW: INVERSE FUNCTIONS

8.1.1 Study: Inverse Functions and Their Derivatives
Re-visit derivatives. Just as you may want to know how fast y changes with respect to x, you may want to know how fast x changes with respect to y.
Duration: 30 mins

8.1.2 Practice: Inverse Functions and Their Derivatives
Re-visit derivatives. Just as you may want to know how fast y changes with respect to x, you may want to know how fast x changes with respect to y.
Duration: 30 mins

8.1.3 Quiz: Derivatives of Inverse Functions
Practice finding derivatives of inverse functions.
Duration: 45 mins; Scoring: 10 points

8.1.4 Study: Inverse Trigonometric Functions
Use implicit differentiation to find the derivatives of arctan(x) and arccos(y).
Duration: 30 mins

8.1.5 Practice: Inverse Trigonometric Functions
Use implicit differentiation to find the derivatives of arctan(x) and arccos(y).
Duration: 30 mins

8.1.6 Quiz: Use Inverse Trig Functions and Identify Their Domain Restrictions
Use inverse trigonometric functions, identify their domain restrictions, and find their derivatives.
Duration: 1 hr 30 mins; Scoring: 16 points

8.1.7 Practice: Determine and Use Derivatives of Inverse Trig Functions
Determine and use derivatives of inverse trig functions.
Duration: 1 hr

LESSON 2 OVERVIEW: REVIEW OF LOGARITHMIC AND EXPONENTIAL FUNCTIONS

8.2.1 Discuss: What Makes Logarithms So Scary?
Discuss what makes logarithms so scary.
Duration: 30 mins; Scoring: 10 points

8.2.2 Practice: Derivatives of Exponential Functions
In this activity, find the derivatives of some specific exponential functions by numerical exploration with your calculator.
Duration: 1 hr

8.2.3 Study: Review of Exponential and Logarithmic Functions
Review some precalculus. It is important to understand the properties of these functions before working with derivatives and integrals that involve them.
Duration: 30 mins

8.2.4 Practice: Review of Exponential and Logarithmic Functions
Review some precalculus. It is important to understand the properties of these functions before working with derivatives and integrals that involve them.
Duration: 30 mins

8.2.5 Quiz: Exponential and Logarithmic Functions
Practice with exponential and logarithmic functions.
Duration: 45 mins; Scoring: 16 points

LESSON 3 OVERVIEW: COMPUTATION OF DERIVATIVES FOR SOME TRANSCENDENTAL FUNCTIONS

8.3.1 Practice: What Is the Area Under 1/x?
In this activity, use your calculator as a tool to find the exact area under the curve y = 1/x.
Duration: 45 mins

8.3.2 Study: Derivatives of Logarithmic and Exponential Functions
Learn how to take the derivatives of logs and exponentials, and learn a new technique for taking messy derivatives.
Duration: 30 mins

8.3.3 Practice: Derivatives of Logarithmic and Exponential Functions
Learn how to take the derivatives of logs and exponentials, and learn a new technique for taking messy derivatives.
Duration: 30 mins

8.3.4 Quiz: Derivatives of Logarithmic and Exponential Functions
Determine derivatives of logarithmic and exponential functions.
Duration: 45 mins; Scoring: 15 points

8.3.5 Practice: Determine Derivatives of Logarithmic and Exponential Functions
Practice determining derivatives of logarithmic and exponential functions.
Duration: 1 hr

8.3.6 Study: Analysis of Curves Involving Transcendental Functions
Revisit some applications of derivatives.
Duration: 30 mins

8.3.7 Practice: Analysis of Curves Involving Transcendental Functions
Revisit some applications of derivatives.
Duration: 30 mins

8.3.8 Quiz: Practicing Curve Analysis
Work on problems involving related rates, rectilinear motion, optimization, and curve analysis. Use multiple functions to describe the relationships in the problems.
Duration: 1 hr; Scoring: 8 points

8.3.9 Practice: Analysis of Curves
Practice applying differentiation to problems involving transcendental functions.
Duration: 1 hr; Scoring: 25 points

8.3.10 Study: L'Hospital's Rule
See how to use L'Hospital's rule to find limits of quotients.
Duration: 30 mins

8.3.11 Practice: L'Hospital's Rule
Practice using L'Hospital's rule to find limits of quotients.
Duration: 30 mins

LESSON 4 OVERVIEW: INTEGRALS OF SOME TRANSCENDENTAL FUNCTIONS

8.4.1 Study: Integrating Transcendental Functions
Review the antiderivative rules for transcendental functions, and start using them to work with integrals.
Duration: 30 mins

8.4.2 Practice: Integrating Transcendental Functions
Review the antiderivative rules for transcendental functions, and start using them to work with integrals.
Duration: 30 mins

8.4.3 Quiz: Antiderivatives of Transcendental Functions
Practice finding antiderivatives involving transcendental functions.
Duration: 45 mins; Scoring: 11 points

8.4.4 Practice: More Definite and Indefinite Integrals
Practice finding antiderivatives and definite integrals for the many types of functions covered in this course.
Duration: 1 hr

8.4.5 Study: Applications of Integrals Using Transcendental Functions
Examine why the applications for the definite integral are valid.
Duration: 30 mins

8.4.6 Practice: Applications of Integrals Using Transcendental Functions
Examine why the applications for the definite integral are valid.
Duration: 30 mins

8.4.7 Practice: More Applications of Integrals
Find and use integrals for situations that include transcendental functions.
Duration: 1 hr; Scoring: 25 points

LESSON 5 OVERVIEW: INVERSE AND TRANSCENDENTAL FUNCTIONS WRAP-UP

8.5.1 Review: Inverse and Transcendental Functions
Review concepts of logarithmic, exponential, inverse and transcendental functions, and computation of some transcendental functions.
Duration: 5 hrs

8.5.2 Test (CST): Inverse and Transcendental Functions
Take a 25-minute test covering inverse and transcendental functions, including inverse trigonometric, exponential, and logarithmic functions, their derivatives and antiderivatives, and applications involving transcendental functions.
Duration: 25 mins; Scoring: 20 points

UNIT 9: SEPARABLE DIFFERENTIAL EQUATIONS AND SLOPE FIELDS

LESSON 1 OVERVIEW: SEPARABLE DIFFERENTIAL EQUATIONS

9.1.1 Study: Differential Equations and Slope Fields
See how to graph a differential equation by visualizing a whole family of functions at once, using a slope field.
Duration: 30 mins

9.1.2 Practice: Differential Equations and Slope Fields
See how to graph a differential equation by visualizing a whole family of functions at once, using a slope field.
Duration: 30 mins

9.1.3 Quiz: Important Concepts From This Unit
Answer questions about differential equations, using a slope field, and prepare for a more in-depth treatment of differential equations.
Duration: 1 hr; Scoring: 9 points

9.1.4 Study: Separable Differential Equations Used in Modeling
Study how to recognize a differential equation and how to solve some really simple differential equations used in modeling “real life” situations.
Duration: 30 mins

9.1.5 Practice: Separable Differential Equations Used in Modeling
Study how to recognize a differential equation and how to solve some really simple differential equations used in modeling “real life” situations.
Duration: 1 hr 45 mins

9.1.6 Quiz: Setting up and Solving Separable Differential Equations
Look at some of the steps involved in setting up and solving these equations.
Duration: 1 hr; Scoring: 11 points

9.1.7 Practice: Applications of Differential Equations
Practice modeling situations as differential equations, and solve those equations.
Duration: 1 hr 45 mins; Scoring: 30 points

LESSON 2 OVERVIEW: EXPONENTIAL GROWTH AND DECAY AND RELATED APPLICATIONS

9.2.1 Study: Exponential Growth and Decay
Look closely at dy/dt = ky, one of the most important differential equations used in modeling where the rate of change depends upon the amount.
Duration: 30 mins

9.2.2 Practice: Exponential Growth and Decay
Look closely at dy/dt = ky, one of the most important differential equations used in modeling where the rate of change depends upon the amount.
Duration: 30 mins

9.2.3 Quiz: Solving Growth and Decay Problems
Practice recognizing and solving differential equations that lead to exponential growth and decay.
Duration: 1 hr; Scoring: 10 points

9.2.4 Study: More Applications of Differential Equations
Look at Newton's law of cooling, mixing problems, falling bodies with air resistance, and logistic growth curves.
Duration: 30 mins

9.2.5 Practice: More Applications of Differential Equations
Look at Newton's law of cooling, mixing problems, falling bodies with air resistance, and logistic growth curves.
Duration: 30 mins

9.2.6 Practice: More Applications of Exponential and Logarithmic Differential Equations
Practice using applications of exponential and logarithmic differential equations.
Duration: 1 hr 15 mins; Scoring: 30 points

LESSON 3 OVERVIEW: SEPARABLE DIFFERENTIAL EQUATIONS AND SLOPE FIELDS WRAP-UP

9.3.1 Review: Separable Differential Equations
Review the concepts of separable differential equations and exponential growth and decay.
Duration: 5 hrs

9.3.2 Test (CST): Separable Differential Equations and Slope Fields
Take a 25-minute test covering real-world problems with differential equations, differential equations leading to exponential growth and decay and solve separable differential equations.
Duration: 25 mins; Scoring: 20 points

UNIT 10: AP EXAM REVIEW AND FINAL EXAM

LESSON 1 OVERVIEW: CALCULUS AS A COHESIVE WHOLE

10.1.1 Study: Strategies for Taking the AP Exam
What to do between now and the Exam, and how to handle yourself during the Exam. Study how AP Exam scores are calculated, and explore some additional strategies for answering Free-response questions.
Duration: 30 mins

10.1.2 Practice: Strategies for Taking the AP Exam
What to do between now and the Exam, and how to handle yourself during the Exam. Study how AP Exam scores are calculated, and explore some additional strategies for answering Free-response questions.
Duration: 30 mins

10.1.3 Practice: Calculus as a Cohesive Whole
Using the Fundamental Theorems of Calculus as a focus, complete a "Concept Map" and take notice of what's helped you see calculus as a cohesive whole.
Duration: 30 mins

10.1.4 Discuss: Calculus as a Cohesive Whole
Write a short question in which the solution requires the test taker to tie concepts from different parts of the Calculus AB course. Also answer a question that has been provided.
Duration: 30 mins; Scoring: 10 points

10.1.5 Practice: Goals for the AP Exam
Review the nine goals stated by the College Board for AP Calculus, using the goals as a framework for reviewing the course and reviewing for the Final Exam and for the AP Exam.
Duration: 40 mins; Scoring: 27 points

LESSON 2 OVERVIEW: REVIEW OF TOPICS

10.2.1 Quiz: AP-Style Multiple-Choice Questions, Part 1
Following an outline of the course, answer questions that review and combine concepts tested on the AP Exam.
Duration: 2 hrs; Scoring: 18 points

10.2.2 Quiz: AP-Style Multiple-Choice Questions, Part 2
Following an outline of the course, answer questions that review and combine concepts tested on the AP Exam.
Duration: 2 hrs; Scoring: 22 points

10.2.3 Practice: AP-Style Free-Response Questions
Answer AP-style Free-Response Questions.
Duration: 6 hrs; Scoring: 30 points

LESSON 3 OVERVIEW: PRACTICE FINAL EXAMS

10.3.1 Practice: Full Final Practice Exam
Time yourself as you practice for the Final Exam and the AP Exam by taking this ungraded test.
Duration: 3 hrs 20 mins

10.3.2 Study: AP Free-Response Questions
Learn general strategies for answering AP free-response questions by learning to score the practice test that you did in the previous activity.
Duration: 30 mins

10.3.3 Practice: AP Free-Response Questions
Learn general strategies for answering AP free-response questions by learning to score the practice test that you did in the previous activity.
Duration: 30 mins

10.3.4 Practice: Scoring Your Practice Exam
Review calculus problem-solving techniques and review AP Exam-taking strategies by applying the AP scoring techniques.
Duration: 2 hrs; Scoring: 30 points

10.3.5 Practice: Self-Scored Practice Exam
Grade yourself on how well you did the scoring work, as well as how you did on the practice exam.
Duration: 4 hrs

10.3.6 Discuss: Should You Take the AP Exam?
With your teacher and with other students in your class, discuss the pros and cons of taking the AP Exam.
Duration: 30 mins; Scoring: 10 points

LESSON 4 OVERVIEW: FINAL EXAM

10.4.1 Exam: Final Exam
Take a simulation of an AP Exam.
Duration: 1 hr 40 mins; Scoring: 45 points

10.4.2 Final Exam: Final Exam
Take a simulation of an AP Exam.
Duration: 1 hr 30 mins; Scoring: 55 points

Course Credit

The course grade will be calculated as follows:

- 50% coursework average;
- 50% summative assessment average, including the final exam;
- A passing course grade is 70 or higher.

Students must attempt all assignments in the course. The final exam will not be available until all assignments have been accepted and graded by the teacher.

Students who score below 70% on the final exam will be eligible for one re-exam opportunity.

Coursework

The graded assignments within each unit are formative in nature. This means that they are designed to assist you in applying and demonstrating the unit concepts, as well as identifying areas in which you need additional review. You may use all the unit's learning activities to assist you as you complete the graded assignments.

Summative Assessments

Summative assessments are those that allow you to demonstrate mastery of the course objectives. For summative assessments, you will NOT be allowed to use the learning materials. These are opportunities for you to show what you have learned by that point in the course. The summative assessments for this course are as follows:

- Unit Tests **(20% of Course Grade)**
- Final Exam **(30% of Course Grade)**

Course Completion and Extensions

- Students may not complete the course in less than 30 days.
- All courses expire six months after the enrollment date. Student may purchase a single three-month extension for a fee.
- Extensions are non-refundable and non-transferrable.

Academic Integrity

It is the aim of the faculty of Texas Tech University to foster a spirit of complete honesty and high standard of integrity. The attempt of students to present as their own any work not honestly performed is regarded by the faculty and administration as a most serious offense and renders the offenders liable to serious consequences, possibly suspension.

"Scholastic dishonesty" includes, but is not limited to, cheating, plagiarism, collusion, falsifying academic records, misrepresenting facts, and any act designed to give unfair

academic advantage to the student (such as, but not limited to, submission of essentially the same written assignment for two courses without the prior permission of the instructor) or the attempt to commit such an act.

Student Expectations

You will be expected to log into the Blackboard course regularly to be aware of possible announcements/reminders and to pace your progress in the course.

Students are expected to maintain an online environment conducive to learning, which includes "netiquette" (Internet etiquette). Please review the basic rules for Online Discussion Netiquette. Ensure that your email messages, discussion board postings, and other electronic communications are thoughtful and respectful. Diverse opinions are welcome in this course, and you are expected to demonstrate an open mind and courtesy when responding to the thoughts and ideas of others.

The following are prohibited:

- making offensive remarks in email or the discussion board;
- using inappropriate language or discussing inappropriate topics online;
- spamming;
- hacking;
- using TTU or Blackboard email or discussion boards for commercial purposes;
- using all caps (considered shouting in online communications); and
- cyber-bullying or online harassment of any type.

Inappropriate behavior shall result in consequences ranging from a request to correct the problem, to removal from the course or even the university, depending on the severity of the behavior. Disciplinary actions will be taken according to the TTU K-12 Student Handbook.

Communication

- You can expect a reply from your instructor within 2 business days.
- Use the Blackboard Course Messages tool for sending messages to your instructor.

Submitting Assignments

You will submit all assignments through the Blackboard Assignment Tool, rather than by email. For assignments that require you to upload a PDF or other document, please title your assignment files "lastName_firstName_assignmentName.*xxx* (.pdf, .doc, .xl, .jpg, etc.)".

continued →

Technical Difficulties

Getting Help

For student assistance with Blackboard, visit TTU K-12 Support.

Computer Problems

A working computer is necessary for online coursework. Computer problems will not be accepted as a valid reason for failure to complete course activities within the allotted time frame. Identify a second computer, before the course begins, that you can use if you experience computer problems.

Server Problems

When the Blackboard server needs to be taken down for maintenance, the Blackboard administrator will post an announcement in your course informing you of the time and date. If the server experiences unforeseen problems, your course instructor will notify you.

Lost or Corrupted Files

You must keep/save a copy of every project/assignment on an external disk or personal computer. In the event of any kind of technology failure (e.g., Blackboard server crash or virus infection, students' own computer problems, loss of files in cyberspace, etc.) or any disputes, the instructor may request or require you to resubmit the files. In some instances, the instructor may need to open another attempt within Blackboard, so communication with your instructor is critical in these circumstances.