



Single Variable Calculus, Early Transcendentals

978-1-63545-100-9



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Source	Author(s) (Text or Video)	Title(s)	Link (where applicable)
OpenStax	Gilbert Strang, Massachusetts Institute of Technology Edwin “Jed” Herman, University of Wisconsin-Stevens Point	Calculus Volume 1 Calculus Volume 2	OpenStax
Mathispower4u Videos	James Sousa		Mathispower4u Videos

Alta Single Variable Calculus was developed to meet the scope and sequence of a typical two-semester calculus course. To develop the course, Knewton used three main sources of content: Openstax, videos created by a Math Professor we have partnered with, and a team of Subject Matter Experts. The SMEs come from diverse backgrounds and are all academics in the field of mathematics.

Alta Single Variable Calculus has two instructional sequences for every learning objective, giving students multiple opportunities to learn new concepts. Between our OpenStax text content, instructional videos, and Knewton SMEs, we were able to solicit ideas from math instructors and students. Alta Single Variable Calculus covers the typical breadth of calculus topics, and also provides the necessary depth to ensure the course is manageable and engaging for instructors and students alike.

Single Variable Calculus, Early Transcendentals | Table of Contents

Chapter 1: A Review of Functions and Graphs

1.1 Review of Functions

- Functions, Function Notation, and Domain and Range
 - Evaluate a function using function notation and determine the domain and range
 - Represent functions using tables, graphs, or formulas
- Symmetry of Functions, Absolute Value, and Function Composition
 - Combine functions using mathematical operators or function composition
 - Understand the symmetry of functions and the absolute value function

1.2 Basic Classes of Functions

- Graphing Lines, Parabolas, and Polynomials
 - Find the slope and equation of lines
 - Use tools such as the quadratic formula and end behavior to graph polynomial functions
 - Understand the difference between algebraic and transcendental functions and find the domain of algebraic functions
- Piecewise Functions and Transformations of Functions
 - Understand and graph piecewise-defined functions
 - Perform transformations of functions (*1)

1.3 Trigonometric Functions

- Radian Measure and Evaluating Trigonometric Functions
 - Understand radian measure and convert between radians and degrees
 - Evaluate trigonometric functions
- Trigonometric Identities, Equations, and Graphs
 - Understand trigonometric identities and use them to solve trigonometric equations
 - Graph periodic functions

1.4 Inverse Functions

- Finding an Inverse Graphically and Algebraically
 - Determine when a function is one-to-one
 - Find the inverse of a function
 - Graph an inverse function
 - Restrict the domain of a function to find an inverse function
- Inverse Trigonometric Functions
 - Evaluate expressions involving inverse trigonometric functions

1.5 Exponential and Logarithmic Functions

- Evaluating and Graphing Exponential Functions
 - Identify and evaluate exponential functions
 - Graph an exponential function
 - Simplify expressions using the law of exponents
 - Understand the base e and use it for application problems
 - Logarithmic Graphs and Properties of Logarithms
 - Convert between logarithmic and exponential form and evaluate logarithmic expressions
 - Graph a logarithmic function
 - Understand the properties of logarithms
-

- Exponential and Logarithmic Equations
 - Solve equations involving exponential functions
 - Solve equations involving logarithmic functions
 - Use the change-of-base formula to evaluate logarithms

Chapter 2: Limits and Continuity

2.1 A Preview of Calculus

- A Preview of Differential and Integral Calculus
 - Preview the tangent problem by using secant lines and average rates of change
 - Preview the area problem by using rectangles to approximate area

2.2 The Limit of a Function

- Limits From a Graph or Table
 - Understand the limit of a function and evaluate a limit from a table
 - Evaluate limits graphically
 - Understand the properties of limits
- Limits Analytically for Continuous and Piecewise Functions
 - Evaluate two-sided limits analytically for continuous functions
 - Evaluate limits analytically for piecewise functions
 - Evaluate limits analytically for absolute value functions

2.3 Calculating Limits Using Limit Laws

- Limits Analytically for Functions with Removable Discontinuities
 - Evaluate two-sided limits analytically for rational functions with removable discontinuities by factoring
 - Evaluate two-sided limits analytically for rational functions with removable discontinuities through expansion
 - Evaluate two-sided limits analytically for complex fractions with removable discontinuities
 - Evaluate two-sided limits analytically for rational functions that contain radicals with removable discontinuities
- Limits Analytically for Trigonometric Functions
 - Evaluate trigonometric limits using direct substitution
 - Evaluate trigonometric limits using special limits
 - Evaluate trigonometric limits using identities
- Infinite Limits
 - Evaluate limits analytically for functions with essential discontinuities
 - Evaluate limits analytically for trigonometric functions with essential discontinuities

2.4 Continuity

- Continuity and the Intermediate Value Theorem
 - Understand the definition of continuity
 - Distinguish between types of discontinuity
 - Understand and apply the intermediate value theorem
 - Continuity of Piecewise Functions
 - Determine whether a piecewise function is continuous
 - Determine the value that makes a piecewise function continuous
-

2.5 Formal Limits

- Precise Definition of a Limit
 - Understand the notation in finding the formal definition of a limit
 - Determine a delta for an arbitrary epsilon given a linear function
 - Determine a delta for an arbitrary epsilon given a quadratic function

Chapter 3: Differentiation

3.1 Defining the Derivative

- Secant Lines and Average Rates of Change
 - Find the average rate of change given a function
 - Find the average rate of change given a table or graph
 - Find the average rate of change given a function and variable intervals
- Tangent Lines and Instantaneous Velocities
 - Determine the sign of the slope of a line tangent to a function at a given point
 - Estimate the slope of the line tangent to a point on a curve
 - Estimate the instantaneous rate of change of a function from successively closer approximations
- The Definition of the Derivative
 - Find the derivative of a function at a point using limits
 - Use the limit definition to find the derivative of a polynomial function
 - Use the limit definition to find the derivative of a rational function
 - Use the limit definition to find the derivative of a function with a radical
- Applications Using the Definition of the Derivative
 - Solve application problems using the definition of the derivative

3.2 The Derivative as a Function

- The Graph of the Derivative Function
 - Estimate the value of a derivative at a point on a graph using a tangent line
 - Determine the open intervals where the first derivative is positive or negative from a graph
 - Determine the graph of the derivative function given the graph of a polynomial function
- Differentiability
 - State the connection between derivatives and continuity
 - Describe three conditions for when a function does not have a derivative
 - Find the constants that make a piecewise function differentiable
 - Determine the graph of the derivative function given the graph of any function

3.3 Basic Differentiation Rules

- The Power Rule and the Sum and Difference Rules
 - Use the constant, constant multiple, and power rule for monomials
 - Apply the sum and difference rules to combine derivatives
 - Use the Power Rule to Explore Tangent Lines
 - Find the equation of the line tangent to a polynomial at a point (*13)
 - Determine where a function has a horizontal tangent
 - Determine the points on a function when tangent lines have a given slope
-

- The Product and Quotient Rules
 - Use the product rule to find the derivative of a function in the form $f(x)g(x)$
 - Use the quotient rule to find the derivative of a function in the form $f(x)/g(x)$
 - Use the product rule to find the derivative of a function in the form $f(x)g(x)h(x)$
 - Combine the product and quotient rules with polynomials
- Extensions of the Power Rule
 - Extend the power rule to functions with negative exponents
 - Extend the power rule to functions with rational exponents
 - Simplify algebraic expressions in order to use the power rule
 - Use the extension of the power rule to explore tangent lines (*5)

3.4 Derivatives of Trigonometric Functions and the Chain Rule

- Derivatives with Trigonometric Functions
 - Find the derivative of a function with sine or cosine
 - Use the product or quotient rule to find a derivative with sine or cosine
 - Find the derivative of a function involving tangent, cotangent, secant, or cosecant
 - Find the equation of a line tangent to a trigonometric function
- The Chain Rule
 - Use the chain rule with the power rule
 - Use the chain rule with trigonometric functions
 - Use the chain rule with the product rule
 - Differentiate a composite of three functions

3.5 Derivatives as Rates of Change and Higher Order Derivatives

- Relate Velocity and Acceleration to Position Functions
 - Find the second derivative with the power rule
 - Find the velocity and acceleration function from the position function
 - Determine when a particle is moving left or right
- Higher Order Derivatives
 - Find a higher-order derivative for $\sin(x)$
 - Determine higher order derivatives requiring the chain rule
- Other Applications Involving Rates of Change
 - Solve application problems involving rates of change

3.6 Derivatives of Inverse Functions and Inverse Trigonometric Functions

- Derivatives of Inverse Functions
 - Find an inverse derivative function value for a polynomial function
 - Find an inverse derivative function value for a rational function
 - Find an inverse derivative function value for a square root function
- Derivatives of Inverse Trigonometric Functions
 - Find the derivative of arcsine or arccosine functions
 - Find the derivative of arctan or arccot functions
 - Find the derivative of arcsec or arccsc functions

3.7 Implicit Differentiation

- Use Implicit Differentiation
 - Use implicit differentiation
 - Use implicit differentiation and the product rule
-

- Use implicit differentiation to find a second derivative
- Use implicit differentiation to find the equation of a tangent line (*14)

3.8 Derivatives of Exponential and Logarithmic Functions

- Derivatives of Exponential Functions with Base e
 - Find the derivative of an exponential function with base e
 - Use product and quotient rules to find the derivative of exponential functions with base e
- Derivatives of Exponential Functions with Any Base
 - Find the derivative of an exponential function with any base
 - Use product and quotient rules to find the derivative of exponential functions with any base
- Derivatives of Natural Log Functions
 - Find the derivative of a natural logarithmic function
 - Use properties of logarithms to find the derivative of a natural logarithmic function
- Derivatives of Logarithmic Functions of Any Base
 - Find the derivative of a logarithmic function that is not base e
 - Use properties of logarithms to find the derivative of a logarithmic function that is not base e
- Logarithmic Differentiation
 - Use logarithmic differentiation with only the power property of logarithms
 - Use logarithmic differentiation with all properties of logarithms

Chapter 4: Applications of Differentiation

4.1 Related Rates

- Related Rates for Volume or Area Problems
 - Use related rates to solve problems involving volume
 - Use related rates to solve problems involving area
- Related Rates in Other Applications
 - Use related rates to solve problems involving distance
 - Use related rates to solve problems involving angles or shadows

4.2 Linear Approximations and Differentials

- Linear Approximations
 - Find the linear approximation of a rational function and use it to estimate function values
 - Find the linear approximation of a function involving roots or powers and use it to estimate function values
 - Find the linear approximation of a trigonometric function and use it to estimate function values
- Find Error Using Differentials
 - Compute a differential
 - Estimate the amount of propagated and relative error using differentials

4.3 Maxima and Minima

- Extreme Value Theorem and Absolute Extrema
 - Understand the extreme value theorem
 - Locate local and absolute extrema from a graph
-

- Locate critical points using derivatives
- Locate absolute extrema

4.4 The Mean Value Theorem

- Rolle's Theorem and the Mean Value Theorem
 - Understand and apply Rolle's Theorem
 - Find values of c guaranteed by the Mean Value Theorem
 - Use the Mean Value Theorem in velocity problems
 - Understand the corollaries of the Mean Value Theorem

4.5 Derivatives and the Shape of the Graph

- First Derivative Test
 - Understand the relationship between the graph of a function and the sign of its derivative (*9)
 - Use the first derivative test to find local extrema from a graph (*21)
 - Use the first derivative test to find local extrema given a function
- Concavity and the Second Derivative Test
 - Determine concavity and find the inflection points from a graph of $f(x)$ (*18)
 - Determine concavity and find the inflection points given a function
 - Use the second derivative test to find local extrema given a function

4.6 Asymptotes and Curve Sketching

- Limits at Infinity
 - Evaluate limits of polynomial functions at infinity
 - Evaluate limits of rational functions at infinity
 - Evaluate limits of trigonometric functions at infinity
 - Evaluate limits of radical and exponential functions at infinity
- End Behavior of a Power Function or Rational Function
 - Identify a horizontal asymptote with limits
 - Determine the end behavior of a power or polynomial function with limits
 - Determine the end behavior of a rational function with limits
- End Behavior of a Function Involving Radicals or Transcendental Functions
 - Determine the end behavior of a function involving a radical with limits
 - Determine the end behavior of a transcendental function
- Sketch the Curve of a Function
 - Sketch the graph of a polynomial
 - Sketch the graph of a rational function
 - Sketch the graph of a function with a cusp

4.7 Optimization

- Applied Optimization Problems
 - Maximize or minimize area or volume
 - Minimize travel time
 - Maximize revenue
 - Minimize surface area
-

- Optimization Problems in the Abstract
 - Maximize the area of an inscribed rectangle
 - Maximize and minimize quantities given an expression with two variables
 - Minimize distance of a function to a point

4.8 L'Hospital's Rule and Indeterminate Forms

- L'Hospital's Rule
 - Apply L'Hospital's Rule in the $0/0$ case
 - Apply L'Hospital's Rule in the (infinity/infinity) case
 - Determine when to apply L'Hospital's Rule
- Extensions of L'Hospital's Rule
 - Apply L'Hospital's Rule in the $0 \cdot \text{infinity}$ case
 - Apply L'Hospital's Rule in the infinity-infinity case
 - Apply L'Hospital's Rule involving exponents of 0 or infinity
 - Use L'Hospital's Rule to compare the growth rates of two functions

4.9 Newton's Method

- Approximations with Newton's Method
 - Use Newton's method to approximate the root of a polynomial
 - Use Newton's method to approximate a square root
 - Determine when Newton's method does not work

Chapter 5: Integration

5.1 Indefinite Integrals

- Antiderivatives and the Integral
 - Find the antiderivative of a function
 - Understand integral notation and verify an indefinite integral
 - Understand the properties of indefinite integrals
 - Evaluate indefinite integrals involving constants or powers
- Evaluating Indefinite Integrals
 - Evaluate indefinite integrals involving roots
 - Evaluate indefinite integrals involving e
 - Evaluate indefinite integrals involving rational functions
 - Evaluate indefinite integrals involving trigonometric functions
- Initial-Value Problems
 - Solve an initial-value problem
 - Solve word problems using integrals and initial values

5.2 Riemann Sums

- Evaluating Sums
 - Understand the properties of sigma notation and use to evaluate sums
 - Understand the rules for the sums and powers of integers and use to evaluate sums
 - Approximating Areas under a Curve and Riemann Sums
 - Approximate the area under a curve using left-endpoint approximation
 - Approximate the area under a curve using right-endpoint approximation
 - Approximate the area under a curve using midpoint approximation
 - Approximate the area under a curve using trapezoidal approximation
-

- Upper and Lower Riemann Sums
 - Find an upper or lower sum given a function
 - Determine if a sum will be an underestimate or overestimate
- Approximating Areas in Application
 - Solve application problems involving approximating areas

5.3 Definite Integrals

- Defining Definite Integrals
 - Explain the terms integrand, limits of integration, and variable of integration, and describe when a function is integrable
 - Evaluate an integral using the definition of the definite integral and left- or right-endpoint approximations
- Calculating Definite Integrals with a Geometric Approach
 - Use a geometric formula to calculate a definite integral
 - Calculate net signed areas under a line using formulas for area of a triangle
 - Calculate total area under a function using geometric formulas
- Properties of Definite Integrals and the Comparison Theorem of Integrals
 - Use the properties of the definite integral
 - Understand the comparison theorem of integrals and use it to compare two functions over a given interval

5.4 The Fundamental Theorem of Calculus

- Integrals and Derivatives with the Fundamental Theorem of Calculus
 - Use the Fundamental Theorem of Calculus to find the derivative of an integral function
 - Use the Fundamental Theorem of Calculus and the chain rule to find a derivative
 - Use the Fundamental Theorem of Calculus with two variable limits of integration
- Evaluating Definite Integrals with the Fundamental Theorem of Calculus
 - Evaluate definite integrals with the Fundamental Theorem of Calculus for functions with positive integer exponents
 - Evaluate definite integrals with the Fundamental Theorem of Calculus for functions with rational exponents
 - Evaluate definite integrals with the Fundamental Theorem of Calculus and the power rule by simplifying

5.5 The Mean Value and Net Change Theorems for Integrals

- The Mean Value Theorem for Integrals
 - Calculate the average value of a linear function using geometric formulas
 - Understand the Mean Value Theorem for Integrals
 - Use the Mean Value Theorem for Integrals to find the average value of a function over an interval
 - Use the Mean Value Theorem for Integrals to find the point on the curve which takes on the average value of the function
 - The Net Change Theorem
 - Understand the net change theorem
 - Find the net displacement of a particle given its velocity function
 - Find the total distance traveled by a particle given its velocity function
-

- Applications of the Net Change Theorem
 - Use the Fundamental Theorem of Calculus in applications with velocity and distance problems
 - Use the net change theorem to find amounts given rates

5.6 Integrating with Substitution

- Integrating Even and Odd Functions
 - Integrate an even function
 - Integrate an odd function
- Substitution and the Power Rule
 - Use substitution to find an indefinite integral with the power rule
 - Use substitution to evaluate a definite integral with the power rule
- Substitution and Trigonometric Functions
 - Use substitution to find an indefinite integral with trigonometric functions
 - Use substitution to evaluate a definite integral with trigonometric functions
- Substitution and Exponential or Logarithmic Functions
 - Use substitution to find an indefinite integral with exponential functions
 - Use substitution to find an indefinite integrals with rational or logarithmic functions
 - Use substitution to evaluate a definite integral with exponential functions
 - Use substitution to evaluate a definite integral with rational or logarithmic functions
- Application Problems with Integrals of Exponential and Logarithmic Functions
 - Solve application problems using integrals of exponential and logarithmic functions
- Substitution and Composite Functions
 - Use substitution to find an indefinite integral of composite functions
 - Use substitution to evaluate a definite integrals of composite functions

5.7 Integrals of Inverse Trigonometric Functions

- Integrating Inverse Trigonometric Functions
 - Evaluate an indefinite integral involving arcsine
 - Evaluate an indefinite integral involving arctan or arcsec
 - Evaluate a definite integral involving an inverse trigonometric function

Chapter 6: Applications of Integrations

6.1 Area Between Two Curves

- Finding the Area of a Region Bounded by Two Curves
 - Find the area of a region between two linear functions
 - Find the area of a region bounded between a linear function and another function
 - Find the area of a region bounded between two curves
 - Finding the Area of Compound Regions
 - Find the area of a region bounded by two functions that cross
 - Find the area of a region bounded above by two different functions
 - Finding the Area of Regions Defined with Respect to y
 - Find the area between two curves defined as a function of y
 - Find the area between two curves by rewriting functions as a function of y
-

6.2 Determining Volume from Cross Sections

- Determining Volume by Slicing
 - Determine the volume of a solid by integrating a cross-section with a circle or semicircle
 - Determine the volume of a solid by integrating a cross-section with a square or rectangle
 - Determine the volume of a solid by integrating a cross-section with a triangle

6.3 Solids of Revolution

- The Disk Method
 - Use the disk method to find the volume of a solid of revolution around the x-axis with polynomials or roots
 - Use the disk method to find the volume of a solid of revolution around the x-axis with other functions
 - Use the disk method to find the volume of a solid of revolution around the y-axis with a function defined as a function of y
- The Washer Method
 - Use the washer method to find the volume of a solid of revolution around the x-axis
 - Use the washer method to find the volume of a solid of revolution around the y-axis
 - Use the washer method to find the volume of a shifted solid of revolution
- The Shell Method
 - Use the shell method to find the volume of a solid of revolution around the y-axis
 - Use the shell method to find the volume of a solid of revolution around the x-axis
 - Use the shell method to find the volume of a shifted solid of revolution
- Solving Solids of Revolution Problems
 - Choose an appropriate method to find the volume of a solid of revolution
 - Use a calculator to find the volume of a solid of revolution

6.4 Arc Length and Surface Area

- Calculating Arc Length
 - Calculate the arc length of a function of x
 - Calculate the arc length of a function of y
 - Use a calculator to determine the arc length of a function
- Area of a Surface of Revolution
 - Calculate the surface area of a surface of revolution around the x-axis
 - Calculate the surface area of a surface of revolution around the y-axis

6.5 Physical Applications

- Mass and Density
 - Calculate the mass of one-dimensional objects given the linear density
 - Calculate the mass of a circular object given the radial density
 - Work and Force for Springs and Cables
 - Understand the relationship between work and force
 - Calculate the amount of work done to compress a spring
 - Calculate the amount of work done to lift an object and cable
 - Work and Pumping Water
 - Solve a pumping problem with a cylindrical tank
 - Solve a pumping problem with a noncylindrical tank
-

- Hydrostatic Force and Pressure
 - Find the hydrostatic force on a trough triangular in shape
 - Find the hydrostatic force on a trough in shapes other than triangles

6.6 Centers of Mass

- Centers of Mass on a Line or Plane
 - Find the center of mass of objects in a line
 - Find the center of mass of objects in a plane
- Centroids of Regions on a Plane
 - Find the centroid of a region bounded by a function and an axis
 - Find the centroid of a region bounded by two functions
 - Use the Theorem of Pappus to find volume

6.7 Hyperbolic Functions

- Introduction to Hyperbolic Functions
 - Evaluate or recognize graphs of hyperbolic functions
 - Use identities of hyperbolic functions
 - Evaluate or determine the domain of an inverse hyperbolic function
- Differentiating Hyperbolic Functions
 - Differentiate a hyperbolic function involving sinh or cosh
 - Differentiate other hyperbolic functions
 - Differentiate inverse hyperbolic functions
- Integrating Hyperbolic Functions
 - Integrate a hyperbolic function involving sinh or cosh
 - Integrate other hyperbolic functions
 - Integrate inverse hyperbolic functions
 - Solve hyperbolic function application problems

Chapter 7: Techniques of Integration

7.1 Integration by Parts

- Basic Integration by Parts with Indefinite Integrals
 - Use integration by parts when u and v are given
 - Use integration by parts for indefinite integrals
- Advanced Integration by Parts with Indefinite Integrals
 - Apply integration by parts more than once for indefinite integrals
 - Use more advanced patterns for integration by parts problems
- Integration by Parts with Definite Integrals
 - Use integration by parts to find the area of a region
 - Use integration by parts to find the volume of a revolution

7.2 Integrating Powers and Products of Trigonometric Functions

- Integrate Powers and Products of Sine and Cosine
 - Integrate products and powers of sine and cosine where at least one exponent is odd
 - Integrate products and powers of sine and cosine where both exponents are even
 - Integrate a product of sine and cosine with different angles
-

- Integrate Powers and Products of Tangent and Secant
 - Integrate products and powers of tangent and secant where tangent has an odd exponent or secant has an even exponent
 - Integrate products and powers of tangent and secant where secant has an odd exponent and tangent has an even exponent

7.3 Trigonometric Substitution

- Integrating with Trigonometric Substitution
 - Integrate a square root of a difference of squares of the form $a^2 - x^2$ using trigonometric substitution
 - Integrate a square root of a sum of squares using trigonometric substitution
 - Use trigonometric substitution to find an arc length
 - Integrate a square root of a difference of squares of the form $x^2 - a^2$ using trigonometric substitution

7.4 Integrating with Partial Fractions

- Integrating with Partial Fractions with Nonrepeated Linear Factors
 - Integrate a rational function using long division of polynomials
 - Integrate a rational function using partial fractions with nonrepeated linear factors
 - Integrate a rational function using long division and partial fractions
 - Integrate a function by applying partial fractions after a substitution
- Integrating Partial Fractions with Repeated Linear Factors or Irreducible Quadratic Factors
 - Integrate a rational function using partial fractions with repeated linear factors
 - Integrate a rational function using partial fractions with an irreducible quadratic factor

7.5 Integrating with References

- Integration Tables and Computer Algebra Systems
 - Use a formula from an integration table to evaluate an integral
 - Use a computer algebra system to evaluate an integral

7.6 Improper Integrals

- Improper Integrals over Infinite Intervals
 - Evaluate an improper integral over an infinite interval
 - Evaluate an improper integral from negative infinity to positive infinity
- Improper Integrals with Discontinuities
 - Evaluate an integral with a discontinuity at one of the limits of integration
 - Evaluate an integral with a discontinuity within the limits of integration
 - Determine if an improper integral converges or diverges using the comparison theorem

7.7 Numerical Integration

- Finding the Error in Midpoint and Trapezoid Approximations
 - Calculate the absolute and relative error using the midpoint rule
 - Calculate the absolute and relative error using the trapezoidal rule
 - Determine error bounds for midpoint and trapezoidal rules
 - Simpson's Rule
 - Approximate the area under a curve using Simpson's rule
 - Determine error bounds for Simpson's rule
-

Chapter 8: Introduction to Differential Equations

8.1 Differential Equations

- Basics of Differential Equations
 - Verify a solution of a differential equation
 - Identify the order of a differential equation
- Linear Differential Equations
 - Find a general solution to a linear differential equation
 - Find a particular solution to a linear differential equation
- Initial-Value Problems
 - Verify a solution to a differential equation initial value problem
 - Solve a differential equation initial value problem
 - Solve applications of differential equation initial value problems

8.2 Direction Fields

- Creating Direction Fields
 - Create a direction field for a first-order differential equation
 - Sketch a solution curve given a direction field
- Identifying Solutions with Direction Fields
 - Identify equilibrium solutions to a differential equation using a direction field
 - Determine if an equilibrium solution is stable, unstable, or semi-stable
 - Use Euler's method to approximate the solution to an initial value problem

8.3 Separable Equations

- Finding General Solutions using Separation of Variables
 - Find a general solution to a differential equation composed of two polynomials using separation of variables
 - Find a general solution to a differential equation with a trigonometric function using separation of variables
 - Find a general solution to a differential equation with an exponential or logarithmic function using separation of variables
- Finding Specific Solutions using Separation of Variables
 - Find a specific solution to a differential equation composed of two polynomials using separation of variables
 - Find a specific solution to a differential equation with a trigonometric function using separation of variables
 - Find a specific solution to a differential equation with an exponential or logarithmic function using separation of variables
- Application Problems using Separation of Variables
 - Solve solution concentration problems using separation of variables
 - Solve Newton's law of cooling problems using separation of variables

8.4 The Logistic Equation

- Solving Logistic Population Growth Problems
 - Understand logistic population growth and carrying capacity as a differential equation
 - Solve a logistic differential equation problem
-

8.5 First-order Linear Differential Equations

- Recognizing and Solving First-order Linear Differential Equations
 - Identify first-order linear differential equations
 - Write first-order linear differential equations in standard form
 - Solve a first-order linear differential equation using an integrating factor
- Applications of First-order Linear Differential Equations
 - Solve first-order differential equation problems about free fall with air resistance
 - Solve first-order differential equation problems about current in electrical circuits

Chapter 9: Sequences and Series

9.1 Sequences

- Determining the Explicit Formula for a Sequence
 - Find the explicit formula for the n th term of an infinite sequence
 - Find the explicit formula for the n th term of a recursively defined sequence
- Determining the Convergence of a Sequence
 - Determine if a sequence converges and if so find its limit
 - Determine if a continuous function defined on a convergent sequence converges and if so find its limit
- Finding the Limit of a Sequence
 - Use the Squeeze Theorem to find the limit of a sequence
 - Determine if a sequence is bounded
 - Find the limit of a sequence using the Monotone Convergence Theorem

9.2 Infinite Series

- Convergent and Harmonic Series
 - Determine whether a series converges or diverges using the sequence of partial sums
 - Evaluate a convergent series using algebraic properties
- Geometric Series
 - Determine if a geometric series converges and if so find its sum
 - Express repeating decimals as fractions using geometric series
 - Evaluate a telescoping series

9.3 Convergence Tests for Series

- The Divergence and Integral Tests
 - Determine if a series diverges using the divergence test
 - Determine if a series converges or diverges using the integral test
 - Determine if a p -series converges or diverges
 - Estimate the value of a convergent series
 - The Comparison Test
 - Determine if a series converges or diverges using the comparison test
 - Determine if a series converges or diverges using the limit comparison test
 - Alternating Series and the Alternating Series Test
 - Determine if an alternating series converges or diverges using the alternating series test
 - Estimate the remainder of an alternating series
 - Determine whether a series converges absolutely or conditionally
-

- Ratio and Root Tests
 - Determine if a series converges or diverges using the ratio test
 - Determine if a series converges or diverges using the root test
- When to Use Convergence Tests
 - Choose an appropriate convergence test for a series
 - Determine if a series converges or diverges

Chapter 10: Power Series

10.1 Power Series and Functions

- Convergent Power Series
 - Identify a power series
 - Find the interval and radius of convergence for a power series
 - Represent a rational function with a power series
 - Determine which convergence property a power series satisfies

10.2 Properties of Power Series

- Combining Power Series
 - Find the interval of convergence of the sum of two power series
 - Find the interval of convergence of the product of a power series and a power
 - Multiply two power series together
- Representing Functions with Power Series
 - Use a power series to solve application problems
 - Find the power series representation of a function using a known power series
 - Find the function represented by a given power series
- Calculus of Power Series
 - Integrate a power series
 - Differentiate a power series
- Differential Equations and Power Series
 - Solve a first order differential equation using a power series
 - Solve Airy's equation using a power series

10.3 Taylor and Maclaurin Series

- Taylor and Maclaurin Polynomials
 - Recognize a Taylor series
 - Find the Taylor polynomials for a function at a value
 - Estimating Function Values with Taylor and Maclaurin Series
 - Find the Maclaurin polynomials for a function
 - Determine the error of an estimated function value using Taylor's theorem
 - Estimate a function value using Taylor polynomials
 - Estimate a trigonometric function value using Maclaurin polynomials
 - Representing Functions with Taylor and Maclaurin Series
 - Represent a function at a value with a Taylor series and determine the interval of convergence
 - Find the Maclaurin series for a function and show that the series converges
-

10.4 Working with Taylor Series

- Binomial Series
 - Find the binomial series for function
 - Estimate a function value using a binomial series
- Finding the Maclaurin Series that Represents a Function
 - Find the Maclaurin series for a trigonometric function
 - Find the Maclaurin series for a logarithmic or exponential function
 - Find a Maclaurin series by differentiating another series
- Applications of the Taylor and Maclaurin Series
 - Evaluate a nonelementary definite integral using a Taylor series
 - Approximate a probability using a Maclaurin series
 - Approximate the period of a pendulum using a binomial series

Chapter 11: Parametric Equations and Polar Coordinates

11.1 Parametric Equations

- Write Parametric Equations
 - Parameterize a curve
 - Find the parametric equations for a line segment given an orientation
- Eliminate the Parameter
 - Eliminate the parameter in linear equations
 - Eliminate the parameter in polynomial and radical equations
 - Eliminate the parameter in exponential and logarithmic equations
 - Eliminate the parameter in trigonometric parametric equations
- Graph Parametric Equations
 - Graph parametric equations by plotting points
 - Graph trigonometric parametric equations by plotting points
 - Use parametric equations in applications
- Cycloids
 - Graph a cycloid defined by parametric equations
 - Determine the number of cusps on a hypocycloid

11.2 Calculus of Parametric Curves

- Derivatives of Parametric Equations
 - Find the derivative of a curve defined by polynomial parametric equations
 - Find the derivative of a curve defined by trigonometric parametric equations
 - Find the equation of a line tangent to a parametrically defined curve
 - Find the second derivative of curve defined by parametric equations
 - Integrating Parametric Curves
 - Find the area under a curve defined by parametric equations
 - Find the arc length of a curve defined by trigonometric parametric equations
 - Find the surface area of a volume of revolution generated by revolving a parametrically defined curve
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11.3 Polar Coordinates

- Defining Polar Coordinates
 - Locate points in a plane by using polar coordinates
 - Convert coordinates from polar form to rectangular form
 - Convert coordinates from rectangular form to polar form
- Converting Equations Between Rectangular and Polar Forms
 - Convert a cartesian equation to polar form
 - Convert a polar equation to cartesian form
- Graphs Using Polar Coordinates
 - Identify symmetry in polar equations and curves
 - Graph polar equations by plotting points and find zeros and maximum values for a polar equation

11.4 Calculus in Polar Coordinates

- Area and Arc Length in Polar Coordinates
 - Find the area of a region between two polar curves
 - Find the arc length of a polar curve
 - Find the area of a region bounded by a polar curve
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