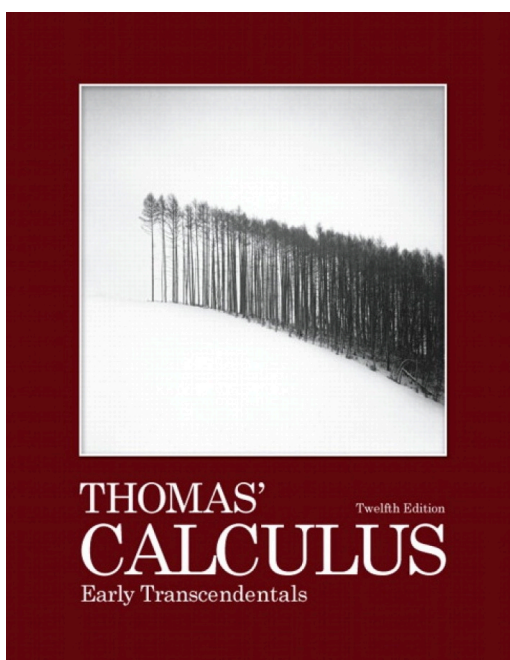


Textbook Information

Math 207 TU – Calculus 1
Spring 2014

The class's textbook policy is as follows. **Students must have a textbook but it does NOT have to be the official textbook designated for this course.** This policy is intended to lower textbook costs. Usually students can purchase a textbook for the course under \$40.

The textbook for this course is the 12th edition of Thomas' Calculus, Early Transcendentals by George B. Thomas, Maurice D. Weir, and Joel Hass (Pearson, 2012; ISBN Number: 978-0-321-662883-1). Students are welcome to use any previous edition at a much lower cost. Students also may rent or purchase e-versions of a calculus book.



Students also may use other calculus books. However, it is essential that students use a text that is labeled **early transcendentals**. These include any early transcendental version (any edition) of calculus textbooks written by:

Soo T. Tan
James Stewart
Ron Larson

Jerrold E. Marsden
Deborah Hughes-Hallett
William Briggs

Those students who intend to pursue mathematics as their major, they will see calculus again, later in their undergraduate studies. That second glimpse into calculus will include much more rigor and in-depth knowledge. For that adventure, Michael Spivak's Calculus text is highly recommended.

Topics In the Textbook

Chapter 1 – Functions

- 1.1 Functions and Their Graphs
- 1.2 Combining Functions; Shifting and Scaling Graphs
- 1.3 Trigonometric Functions
- 1.4 Graphing with Calculators and Computers
- 1.5 Exponential Functions
- 1.6 Inverse Functions and Logarithms

Chapter 2 – Limits and Continuity

- 2.1 Rates of Change and Tangents to Curves
- 2.2 Limit of a Function and Limit Laws
- 2.3 The Precise Definition of a Limit
- 2.4 One-Sided Limits
- 2.5 Continuity
- 2.6 Limits Involving Infinity; Asymptotes of Graphs

Chapter 3 – Differentiation

- 3.1 Tangents and the Derivative at a Point
- 3.2 The Derivative as a Function
- 3.3 Differentiation Rules
- 3.4 The Derivative as a Rate of Change
- 3.5 Derivatives of Trigonometric Functions
- 3.6 The Chain Rule
- 3.7 Implicit Differentiation
- 3.8 Derivatives of Inverse Functions and Logarithms
- 3.9 Inverse Trigonometric Functions
- 3.10 Related Rates
- 3.11 Linearization and Differentials

Chapter 4 - Applications of Derivatives

- 4.1 Extreme Values of Functions
- 4.2 The Mean Value Theorem
- 4.3 Monotonic Functions and the First Derivative Test
- 4.4 Concavity and Curve Sketching
- 4.5 Indeterminate Forms and L'Hôpital's Rule
- 4.6 Applied Optimization
- 4.7 Newton's Method
- 4.8 Antiderivatives

Chapter 5 – Integration

- 5.1 Area and Estimating with Finite Sums
- 5.2 Sigma Notation and Limits of Finite Sums
- 5.3 The Definite Integral
- 5.4 The Fundamental Theorem of Calculus
- 5.5 Indefinite Integrals and the Substitution Method
- 5.6 Substitution and Area Between Curves

Chapter 6 – Applications of Definite Integrals

- 6.1 Volumes Using Cross-Sections
- 6.2 Volumes Using Cylindrical Shells
- 6.3 Arc Length
- 6.4 Areas of Surfaces of Revolution
- 6.5 Work and Fluid Forces
- 6.6 Moments and Centers of Mass

Chapter 7 – Integrals and Transcendental Functions

- 7.1 The Logarithm Defined as an Integral
- 7.2 Exponential Change and Separable Differential Equations
- 7.3 Hyperbolic Functions
- 7.4 Relative Rates of Growth

Chapter 8 – Techniques of Integration

- 8.1 Integration by Parts
- 8.2 Trigonometric Integrals
- 8.3 Trigonometric Substitutions
- 8.4 Integration of Rational Functions by Partial Fractions
- 8.5 Integral Tables and Computer Algebra Systems
- 8.6 Numerical Integration
- 8.7 Improper Integrals

Chapter 9 – First-Order Differential Equations

- 9.1 Solutions, Slope Fields, and Euler's Method
- 9.2 First-Order Linear Equations
- 9.3 Applications
- 9.4 Graphical Solutions of Autonomous Equations
- 9.5 Systems of Equations and Phase Planes

Chapter 10 – Infinite Sequences and Series

- 10.1 Sequences
- 10.2 Infinite Series
- 10.3 The Integral Test
- 10.4 Comparison Tests
- 10.5 The Ratio and Root Tests
- 10.6 Alternating Series, Absolute and Conditional Convergence
- 10.7 Power Series
- 10.8 Taylor and Maclaurin Series
- 10.9 Convergence of Taylor Series
- 10.10 The Binomial Series and Applications of Taylor Series

Chapter 11 – Parametric Equations and Polar Coordinates

- 11.1 Parametrizations of Plane Curves
- 11.2 Calculus with Parametric Curves
- 11.3 Polar Coordinates
- 11.4 Graphing in Polar Coordinates
- 11.5 Areas and Lengths in Polar Coordinates

Chapter 12 – Vectors and the Geometry of Space

- 12.1 Three-Dimensional Coordinate Systems
- 12.2 Vectors
- 12.3 The Dot Product
- 12.4 The Cross Product
- 12.5 Lines and Planes in Space
- 12.6 Cylinders and Quadric Surfaces

Chapter 13 – Vector-Valued Functions and Motion in Space

- 13.1 Curves in Space and Their Tangents
- 13.2 Integrals of Vector Functions; Projectile Motion
- 13.3 Arc Length in Space
- 13.4 Curvature and Normal Vectors of a Curve
- 13.5 Tangential and Normal Components of Acceleration
- 13.6 Velocity and Acceleration in Polar Coordinates

Chapter 14 – Partial Derivatives

- 14.1 Functions of Several Variables
- 14.2 Limits and Continuity in Higher Dimensions
- 14.3 Partial Derivatives
- 14.4 The Chain Rule
- 14.5 Directional Derivatives and Gradient Vectors
- 14.6 Tangent Planes and Differentials
- 14.7 Extreme Values and Saddle Points
- 14.8 Lagrange Multipliers
- 14.9 Taylor's Formula for Two Variables
- 14.10 Partial Derivatives with Constrained Variables

Chapter 15 – Multiple Integrals

- 15.1 Double and Iterated Integrals over Rectangles
- 15.2 Double Integrals over General Regions
- 15.3 Area by Double Integration
- 15.4 Double Integrals in Polar Form
- 15.5 Triple Integrals in Rectangular Coordinates
- 15.6 Moments and Centers of Mass
- 15.7 Triple Integrals in Cylindrical and Spherical Coordinates
- 15.8 Substitutions in Multiple Integrals

Chapter 16 – Integration in Vector Fields

- 16.1 Line Integrals
- 16.2 Vector Fields and Line Integrals: Work, Circulation, and Flux
- 16.3 Path Independence, Conservative Fields, and Potential Functions
- 16.4 Green's Theorem in the Plane
- 16.5 Surfaces and Area
- 16.6 Surface Integrals
- 16.7 Stokes' Theorem
- 16.8 The Divergence Theorem and a Unified Theory

Chapter 17 – Second-Order Differential Equations

- 17.1 Second-Order Linear Equations
- 17.2 Nonhomogeneous Linear Equations
- 17.3 Applications
- 17.4 Euler Equations
- 17.5 Power Series Solutions

Appendices

- A.1 Real Numbers and the Real Line
- A.2 Mathematical Induction
- A.3 Lines, Circles, and Parabolas
- A.4 Proofs of Limit Theorems
- A.5 Commonly Occurring Limits
- A.6 Theory of the Real Numbers
- A.7 Complex Numbers
- A.8 The Distributive Law for Vector Cross Products
- A.9 The Mixed Derivative Theorem and the Increment Theorem