

Calculus I: A Guided Inquiry

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Wiley & Sons / POGIL Press

Printed and distributed by agreement with
John Wiley and Sons, Inc.

Proceeds to benefit the POGIL Project
www.pogil.org

Bring **active learning** into your classroom or recitation section.

The guided activities found in this unique workbook cover all the topics of a traditional Calculus I course using an approach based on **research on how students learn**.

In each activity, specially designed questions guide students to examine a data set (often a graph or table) and **construct an understanding** of the underlying concept.

Students simultaneously **learn course content and key reasoning skills**, including how to ask questions, think critically, analyze data and graphs, solve problems, and work successfully as part of a collaborative team.

The active thinking, discussion, and discovery that take place during class frequently culminate in an **Aha! Moment**. Such moments **build confidence**. Facing subsequent challenges, students rely less on memorization, and instead work to **create their own understanding**.

Students come away with a sense of ownership over the material and an **I can do this** attitude.

Contents

Functions

- F1: Review of Functions
- F2: Characteristics of Functions
- F3: Compositions of Functions

Limits

- L1: Limit of a Function
- L2: Limit Laws
- L3: Precise Definition of a Limit
- L4: Continuity

Derivatives

- D1: Velocity, Introduction to Derivatives
- D2: Derivative at a Point
- D3: Derivative as a Function
- D4: Differentiability
- D5: Second Derivative

Differentiation Techniques

- DT1: Power, Constant Multiple, Sum and Difference Rules
- DT2: Product and Quotient Rules
- DT3: Derivatives of Exponential and Logarithm Functions
- DT4: Derivatives of Trigonometric Functions
- DT5: The Chain Rule
- DT6: Derivatives of Inverse Functions
- DT7: Implicit Differentiation

Differentiation Applications

- DA1: Related Rates
- DA2: Linear Approximation
- DA3: Mean Value Theorem
- DA4: Maximum and Minimum Values
- DA6: Optimization

Integration

- I1: Area and Distance
- I2: Riemann Sums
- I3: Definite Integrals
- I4: Fundamental Theorem of Calculus (FTC)
- I5: Antiderivatives and the FTC
- I6: Indefinite Integrals