

2017-2018 SYLLABUS

INTRODUCTION TO CALCULUS

Kellenberg Memorial High School – Revised May, 2017

Class Presentations and Assignment Worksheets:

Each topic on the syllabus includes a class presentation which is available for reference Bro. Gary's website. Assignments consist of worksheets associated with each presentation. The worksheets are available on Bro. Gary's website.

First Trimester:

Chapter P – Preliminaries

- P-01 Welcome
- P-02 Introduction to the TI-84 Calculator
- P-03 Mathematics – The Queen of the Sciences
- P-04 More Calculator Goodies
- P-05 Principles of Finance and Economics
- P-06 Expanding Knowledge of Trigonometry
- P-07 Trigonometric Proofs
- P-08 Logarithms and Scientific Notation
- P-09 Analytic Geometry
- P-10 Properties of Graphs and Functions [Early October]

Chapter 1 - Limits

- 1-01 Simple Graphs, Useful Terms and a New Notation
- 1-02 Evaluating Limits Analytically
- 1-03 More Analytic Techniques for Evaluating Limits
- 1-04 The Difference Quotient Formula
- 1-05 Special Limits, Part A – One-Sided Limits
- 1-06 Special Limits, Part B – Infinite Limits and Limits at Infinity
- 1-07 Special Limits, Part C – Interesting and Unusual Limits
- 1-08 Continuity
- 1-09 The Intermediate Value Theorem
- 1-10 Epsilonics [Late October]

Chapter 2 – Differentiation

- 2-01 The Tangent Line Problem
- 2-02 Basic Differentiation Rules
- 2-03 Falling Objects and Rates of Change
- 2-04 The Product and Quotient Rules for Derivatives
- 2-05 Derivatives of Trigonometric Functions
- 2-06 Higher Order Derivatives
- 2-07 The Chain Rule
- 2-08 Tangents, Harmonic Motion, Famous Curves
- 2-09 Implicit Differentiation
- 2-10 Proving Rules of Derivatives [Mid-December]

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Second Trimester:

Chapter 3 – Applications of Derivatives

- 3-01 Derivatives and Critical Points
- 3-02 Optimization Problems, Part I
- 3-03 Principles of Finance and Economics
- 3-04 Optimization Problems A-B-C-D
- 3-05 Related Rates
- 3-06 Differentials
- 3-07 Inventory Control
- 3-08 Newton's Method
- 3-09 Multiple Ways of Solving Problems
- 3-10 Important Theorems
- 3-11 Fun and Interesting Problems [Early February]

Chapter 4 - Integration

- 4-01 Three Preliminary Ideas
- 4-02 Antiderivatives
- 4-03 Riemann Sums
- 4-04 The Definite Integral
- 4-05 Properties of Integrals
- 4-06 U-Substitution [Mid March]

Chapter 5 – Applications of Integration, Part A

- 5-01 Applications of Integration
- 5-02 Definite Integrals and Area under a Curve
- 5-03 The Area between Two Curves
- 5-04 Introduction to Differential Equations
- 5-05 Integration Using Graphs
- 5-06 Integration Theorems
- 5-07 Numerical Integration
- 5-08 Solids of Revolution, Disk Method A
- 5-09 Solids of Revolution, Disk Method B
- 5-10 Solids of Revolution, Shell Method
- 5-11 Work
- 5-12 Arc Length and Surface Area [April]

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Third Trimester:

Chapter 6 – Logarithms and Exponentials

- 6-01 Introduction to Logarithms
- 6-02 Calculus with Logarithms and Exponentials
- 6-03 Evaluating and Solving Logarithmic and Exponential Equations
- 6-04 Applications of Logarithms and Exponentials
- 6-05 Some Intellectual Achievements of Calculus
- 6-06 Present Value and Future Value
- 6-07 Integration by Parts

Chapter 7 – Graphs, Equations and Regression

- 7-01 Parametric Equations
- 7-02 Parametric Equations and Calculus
- 7-03 Polar Equations
- 7-04 Polar Equations and Calculus
- 7-05 Interesting Questions
- 7-06 Rectangular Graphing, Extended
- 7-07 Regression Analysis [Early May]

Calculator – TI-84 Plus, Silver Edition

Video Lecture Series:

Understanding Calculus: Problems, Solutions, and Tips,

Presenter: Prof. Bruce Edwards, University of Florida

Produced by: The Great Courses

Note: This is a collection of 36 half-hour video presentations by Professor Edwards. These videos are available on-line through Bro. Gary's website; access to these videos by this method has the full permission of the producer. These videos are used as supplemental material for class topics.

On-Line Video Resources through YouTube:

The Presentation portion of each syllabus topic includes one or more explicit references to the many video resources available through YouTube. Kahn Academy and PatrickJMT are especially recommended as excellent resources.

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Reference Textbook:

Calculus of a Single Variable, Larson Hostetler and Edwards, Eighth Edition

Note: The course syllabus is based on the order of topics in the textbook. Students are not expected to use the textbook. All class presentation materials and homework assignments will be delivered via Bro. Gary's website.

Classroom Management Systems:

E-BackPack will be used for the assignment and collection of homework.

Notability will be recommended to the students as the primary note-taking method.

Google Classroom will be used for the weekly plan of the week and for the delivery of the video quizzes associated with the Video Series by Professor Edwards.

Brother Gary's website is the main reference source for presentations, worksheets, sample tests and other items associated with the course.

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