

Virginia Western Community College

MTH 261

Applied Calculus I

Prerequisites

Completion of MTH 161, MTH 167 or equivalent with a grade of C or better.

Course Description

Introduces limits, continuity, differentiation and integration of algebraic, exponential and logarithmic functions and techniques of integration with an emphasis on applications in business, social sciences and life sciences.

Semester Credits: 3

Lecture Hours: 3

Required Materials

Textbook:

No required materials. Course is OER.

Course Outcomes

At the completion of this course, the student should be able to:

- Evaluate limits and interpret them graphically.
- Determine the derivatives of algebraic, exponential and logarithmic functions.
- Solve applied problems with derivatives.
- Use derivatives to determine the graphical properties of functions.
- Apply derivatives to solve exponential growth and decay problems.
- Determine indefinite integrals.

Topical Description

<u>Section</u>	<u>Topic</u>
1.1	Limits : A numerical and graphical approach
1.2	Algebraic limits and Continuity
1.3	Average Rate of Change
1.4	Differentiation using limits of difference quotients
1.5	Differentiation techniques : The power and sum-difference techniques
1.6	Differentiation techniques ; Product/quotient rules
1.7	Chain Rule

- 1.8 Higher order derivatives
- 2.1 Using 1st derivatives to find max/min values and sketch graphs.
- 2.2 Using 2nd derivatives to find max/min values and sketch graphs
- 2.3 Graph sketching : Asymptotes and Rational Functions
- 2.4 Using derivatives to find absolute mx/min values
- 2.5 Max/min problems; Business and economics applications
- 2.6 Marginals and differentials
- 2.7 Implicit differentiation and related rates

- 3.1 Exponential functions
- 3.2 Logarithmic functions
- 3.3 Applications : Uninhibited and limited growth models
- 3.4 Applications : Decay
- 3.5 The derivatives of exponential and logarithms base a
- 3.6 Elasticity of demand

- 4.1 Antidifferentiation
- 4.2 Antiderivatives as areas
- 4.3 Area and definite integrals
- 4.4 Properties of definite integrals
- 4.5 Integration Techniques : Substitution

Notes to Instructors:

The final exam must be comprehensive.