Calculus 1

Class

MATH 2413

This course presents terminology, concepts, and techniques needed to study limits, continuity, differentiation, and integration of algebraic, trigonometric, exponential, and logarithmic functions. Exercises are designed to allow students to demonstrate their reasoning ability, to determine maxima and minima, and to analyze functions and their graphs. Six lecture hours per week.

Competencies

1. To demonstrate competency in concepts of limits, the student should be able to:
    i. Determine limits.
    ii. Recognize when a limit does not exist.
    iii. Determine continuity and one-sided limits.
    iv. Determine infinite limits.
    v. Determine limits at infinity.
2. To demonstrate competency in concepts of the derivative, a student should be able to:
    i. Find the derivative of a function by using the definition of the derivative.
    ii. Find the slope of the tangent line to a curve.
    iii. Find the equation of the tangent line to a curve.
    iv. Use the differential rules for algebraic and transcendental functions.
3. To demonstrate competency in the use of the derivative, a student should be able to:
    i. Find rate of change, velocity, and acceleration.
    ii. Use the product and quotient rules to find derivatives.
    iii. Find higher order derivatives.
    iv. Use the chain rule to find derivatives.
    v. Use implicit differentiation to find derivatives.
    vi. Solve problems using related rates.
    vii. Determine extrema on an interval.
    viii. Use Rolle's Theorem.
    ix. Use the Mean Value Theorem.
    x. Use the derivative to sketch curves.
    xi. Solve optimization applications.
4. To demonstrate competency in the use of methods of estimation, a student should be able to:
    i. Use Newton's Method.
    ii. Use differentials.
    iii. Find the error of propagation.
5. To demonstrate competency in analyzing the graphs of functions, a student should be able to:
    i. Find all critical points and determine maxima and minima.
    ii. Find all inflection points and determine concavity.
    iii. Use the second derivative test.
    iv. Find horizontal and slant asymptotes.
    v. Sketch curves.
6. To demonstrate competency in the concepts of integrals, a student should be able to:
    i. Find antiderivatives
    ii. Find indefinite integrals.
    iii. Find the area under a curve.
    iv. Determine area using Riemann Sums.
    v. Find definite integrals for algebraic and transcendental functions.
7. To demonstrate competency in the use of the integral, a student should be able to:
    i. Use the Fundamental Theorem of Calculus.
    ii. Do numerical integration.

Campus Resources for Students

Weatherford:
The Academic Support Center is a free public tutoring service provided by the college, offered in LART- LL Room 2, 817-598-6278

Video tapes

Computer assisted instruction

Instructor's office hours

Course Learning Objectives

After completing the course, the student should be able to demonstrate competency in:

1. Concepts of limits.
2. Concepts of the derivative.
3. The use of the derivative.
4. The use of methods of estimation.
5. Analyzing the graphs of functions.
6. The concepts of integrals.
7. The use of the integral.

Required Textbooks
Calculus 11th Ed., Larson, Edwards, Brooks/Cole Cengage Learning, 2014.
Evaluation Standards

These course learning outcomes and course competencies will be assessed through the administration of a minimum of 4 in-class exams (65%), quizzes and/or homework (10%) and a comprehensive, departmental final exam (25%). No calculators will be allowed on the final exam. All final exam answers will be exact.

Disabilities

ADA Statement:

Any student with a documented disability (e.g. learning, psychiatric, vision, hearing, etc.) may contact the Office on the Weatherford College Weatherford Campus to request reasonable accommodations. *Phone:* 817-598-6350 *Office Location:* Office Number 118 in the Student Services Building, upper floor. *Physical Address:* Weatherford College 225 College Park Drive Weatherford, TX.

Academic Integrity
Academic Integrity is fundamental to the educational mission of Weatherford College, and the College expects its students to maintain high standards of personal and scholarly conduct. Academic dishonesty of any kind will not be tolerated. Academic dishonesty includes, but is not limited to, cheating on an examination or other academic work, plagiarism, collusion, and the abuse of resource materials including unauthorized use of Generative AI. Departments may adopt discipline specific guidelines on Generative AI usage approved by the instructional dean. Any student who is demonstrated to have engaged in any of these activities will be subject to immediate disciplinary action in accordance with institutional procedures.