

MATH - 22100 Calculus for Technology I

Course Learning Objectives

The IUPUI Department of Mathematical Sciences has established the following mathematics learning objectives to make clear to the students and instructors what knowledge, understanding, and skills students should acquire in Calculus for Technology I. In the IUPUI Department of Mathematical Sciences this material is found in the course Math 22100 Calculus for Technology I.

Brief Summary of Math 22100 Learning Objectives

1. Functions, Limits and Tangent Lines

- Students recognize, sketch graphs and use basic properties of the elementary functions (polynomials, rational, trigonometric, inverse trigonometric, exponential, and logarithmic).
- Students know the concept of limit of a function and the concept of continuity, find limits of an algebraic function, one sided limits and infinite limits.
- Students know and can use the concepts of instantaneous rate of change and the slopes of tangent lines of the curve.
- Students can find the equation of the tangent line to the curve at a given point.

2. Differentiation

- Students know the definition of a derivative and use the definition to find the derivative of an algebraic function.
- Students know the rules of differentiation and use the rules to find the derivatives of algebraic, trigonometric, inverse trigonometric, exponential and logarithmic functions.
- Students know higher derivatives and find these derivatives.
- Students use implicit differentiation to find derivatives.
- Students know and find differentials.

3. Applications of differentiation

- Students find critical and inflection points, know and use first derivative test and second derivative test for curve sketching.
- Students know and find the first and the second derivatives to find the maximum and minimum values of a function.
- Students solve optimization problems.

4. Anti-Derivatives and Introduction to Integration

- Students know and can find the anti-derivative.
- Students can give a geometric interpretation of an integral as the area under the graph of a function.
- Students know the Fundamental Theorem of Calculus.
- Students can evaluate an integral by substitution.

5. Applications of Integration

- Students can use integration to evaluate the area under a curve.
- Students can use integration to evaluate the area between two curves.
- Students can use integration to evaluate volumes of solid of revolution by the disk, washer, and shell methods.

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