MTH 241 : CALCULUS FOR MANAGEMENT/SOCIAL SCIENCE

Transcript title

Calculus for Mgmt/Soc Science

Credits

4

Grading mode

Standard letter grades

Total contact hours

40

Lecture hours

40

Prerequisites

MTH 111Z or higher (except MTH 211, MTH 212, MTH 213, MTH 244, and STAT 243Z) or minimum placement Math Level 20.

Course Description

Introduces basic concepts of differential and integral calculus for students majoring in management and social science. Includes elementary differential and integral calculus of polynomial, logarithmic, and exponential functions and their applications to business, management, and social sciences. Uses graphing technology.

Course learning outcomes

1. Apply calculus concepts to solve applications from the general, social, and management sciences.
2. Interpret solutions in the context of the application.
3. Apply the basic techniques of differentiation and integration to polynomial, rational, exponential, and logarithmic functions to investigate the behavior of mathematical models from the general, social, and management sciences.
4. Apply topics and skills from calculus in conjunction with graphing technology to investigate and interpret graphs of models.

Content outline

1. Students will use mathematical functions to model both real-world and theoretical applications from the general, social, and management sciences, applying appropriate calculus concepts to solve those applications, to judge if the results are reasonable, and to interpret and clearly communicate the results.
   a. Find average rates of change for functions presented in graphical, tabular, or symbolic form.
   b. Estimate instantaneous rates of change for functions presented in graphical, tabular, or symbolic form.
   c. Solve and interpret applications of rates of change and the derivative, including marginal cost, revenue, and profit.
   d. Solve and interpret applications of extrema, concavity, and curve sketching.
   e. Solve and interpret applications of extrema including optimization and elasticity.
   f. Solve and interpret applications of derivatives including present and future values.
   g. Determine or estimate the total change in a function when the derivative of the function is presented in graphical, tabular, or symbolic form.
   h. Solve and interpret the practical meaning of the integral in appropriate applications such as consumer and producer surplus.
2. Students will apply the basic techniques of differentiation and integration to polynomial, rational, exponential, and logarithmic functions to investigate the behavior of mathematical models from the general, social, and management sciences.
   a. Determine or estimate the limit at a point (from the left, from the right, and two-sided) for functions presented in graphical, tabular, or symbolic form.
   b. Identify points of discontinuity for functions presented in graphical or symbolic form.
   c. Identify intervals of continuity for functions presented in graphical form.
   d. Estimate derivative values for functions presented in graphical, tabular, or symbolic form.
   e. Identify the local extrema and the intervals over which a function is increasing, decreasing, or constant.
   f. Identify the concavity and points of inflection for a function.
   g. Determine the shape of a function from numerical information about that function's first and second derivatives.
   h. Utilize the power, sum, and difference rules to differentiate polynomial, rational, and exponential functions.
   i. Use the rules for finding the family of antiderivatives of:
      i. polynomial functions
      ii. exponential functions
      iii. f(x)=1/x
   j. Find left-hand and right-hand Riemann sums for functions presented in graphical, tabular, or symbolic form.
   k. Evaluate definite integrals using the Fundamental Theorem of Calculus.
3. Apply topics and skills from calculus in conjunction with graphing technology to investigate and interpret graphs of models.
   a. Sketch the graph of the derivative for functions presented in graphical form.
   b. Determine the shape of a function from graphical information about that function's first and second derivatives.
   c. Estimate average rate of change, instantaneous rate of change and total change using function graphs.

Required materials

This course may require a textbook.

General education/Related instruction lists

- Mathematics