

Chapter 5 Technology Application Projects

Mathematica/Maple Module

Using Riemann Sums to Estimate Areas, Volumes, and Lengths of Curves

Visualize and approximate areas and volumes in Part I.

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Riemann Sums, Definite Integrals, and the Fundamental Theorem of Calculus

Parts I, II, and III develop Riemann sums and definite integrals. Part IV continues the development of the Riemann sum and definite integral using the Fundamental Theorem to solve problems previously investigated.

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Rain Catchers, Elevators, and Rockets

Part I illustrates that the area under a curve is the same as the area of an appropriate rectangle for examples taken from the chapter. You will compute the amount of water accumulating in basins of different shapes as the basin is filled and drained.

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Motion Along a Straight Line, Part II

You will observe the shape of a graph through dramatic animated visualizations of the derivative relations among the position, velocity, and acceleration. Figures in the text can be animated using this software.

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Bending of Beams

Study bent shapes of beams, determine their maximum deflections, concavity and inflection points, and interpret the results in terms of a beam's compression and tension.