

Chapter 5: Applications of Definite Integrals

Upon successful completion of Chapter 5, the student should be able to:

Set up and use definite integrals to calculate the exact volumes of solids including solids of revolution

Set up and evaluate definite integrals to calculate lengths of curves of the form $y=f(x)$ and $(x(t), y(t))$

Set up and evaluate definite integrals to calculate the work required by lifting and pumping

Calculate the moments and centers of mass of planar regions

Adapt the “problem \Rightarrow Riemann sum \Rightarrow definite integral \Rightarrow number” model to other assorted problems such as kinetic energy of a rotating bar, hydrostatic pressure force against a submerged object, and models of voting behavior