# Chapter 5. Integration

# 5.1 Estimating with Finite Sums

**Note.** In this section, we use finite sums to estimate quantities which we will calculate precisely using integrals.

**Examples.** Page 352 Example 1: estimate the area under $y = 1 - x^2$ and above the $x$-axis for $x \in [0, 1]$. Cut the region into 4 parts of equal width and then approximate the area using rectangles. For the height of each rectangle, use (1) the left hand endpoint, (2) the right hand endpoint, and (3) the midpoint of each little "subinterval." The actual area is 2/3. Notice Table 5.1 on page 355.

**Example.** Page 361 number 12.