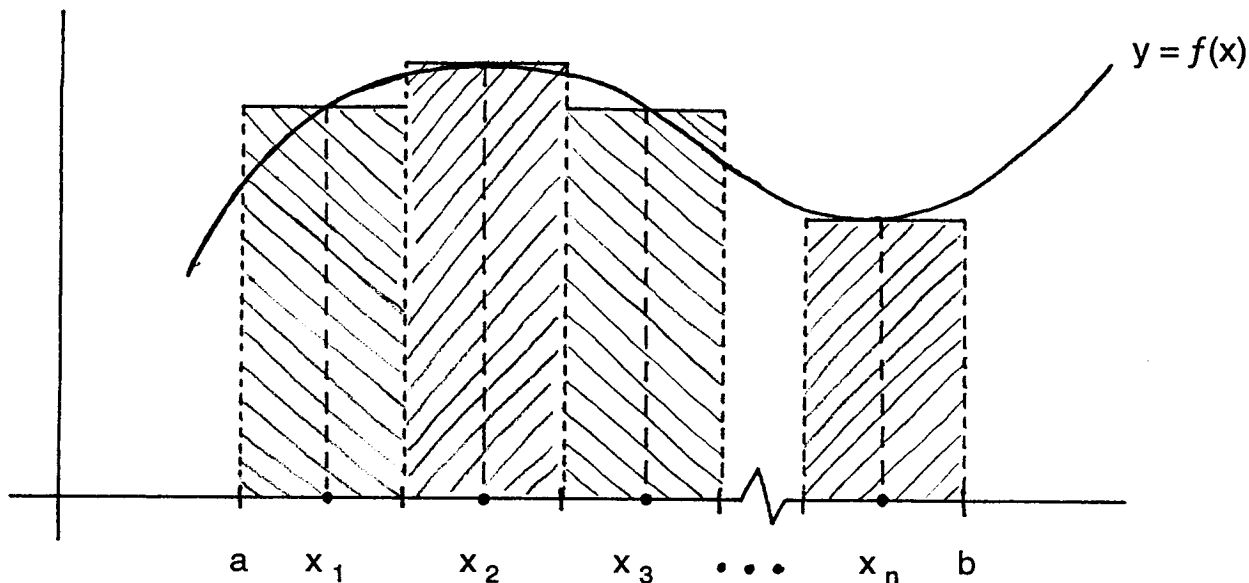


Math 16B  
Kouba  
Midpoint Rule

Suppose that the integral  $\int_a^b f(x) dx$  is too difficult to compute its

anti-derivative or that you are simply required to estimate its exact value. The following steps will result in an *estimate* of this definite integral. This method is called the Midpoint Rule.



- 1.) Divide the interval  $[a, b]$  into  $n$  equal parts, each of length  $\frac{b-a}{n}$ .
- 2.) Pick the midpoint of each subinterval and label them

$$x_1, x_2, x_3, \dots, x_n .$$

- 3.) An estimate for the definite integral  $\int_a^b f(x) dx$  is

$$M_n = \frac{b-a}{n} f(x_1) + \frac{b-a}{n} f(x_2) + \dots + \frac{b-a}{n} f(x_n)$$

$$= \frac{b-a}{n} [ f(x_1) + f(x_2) + \dots + f(x_n) ] .$$