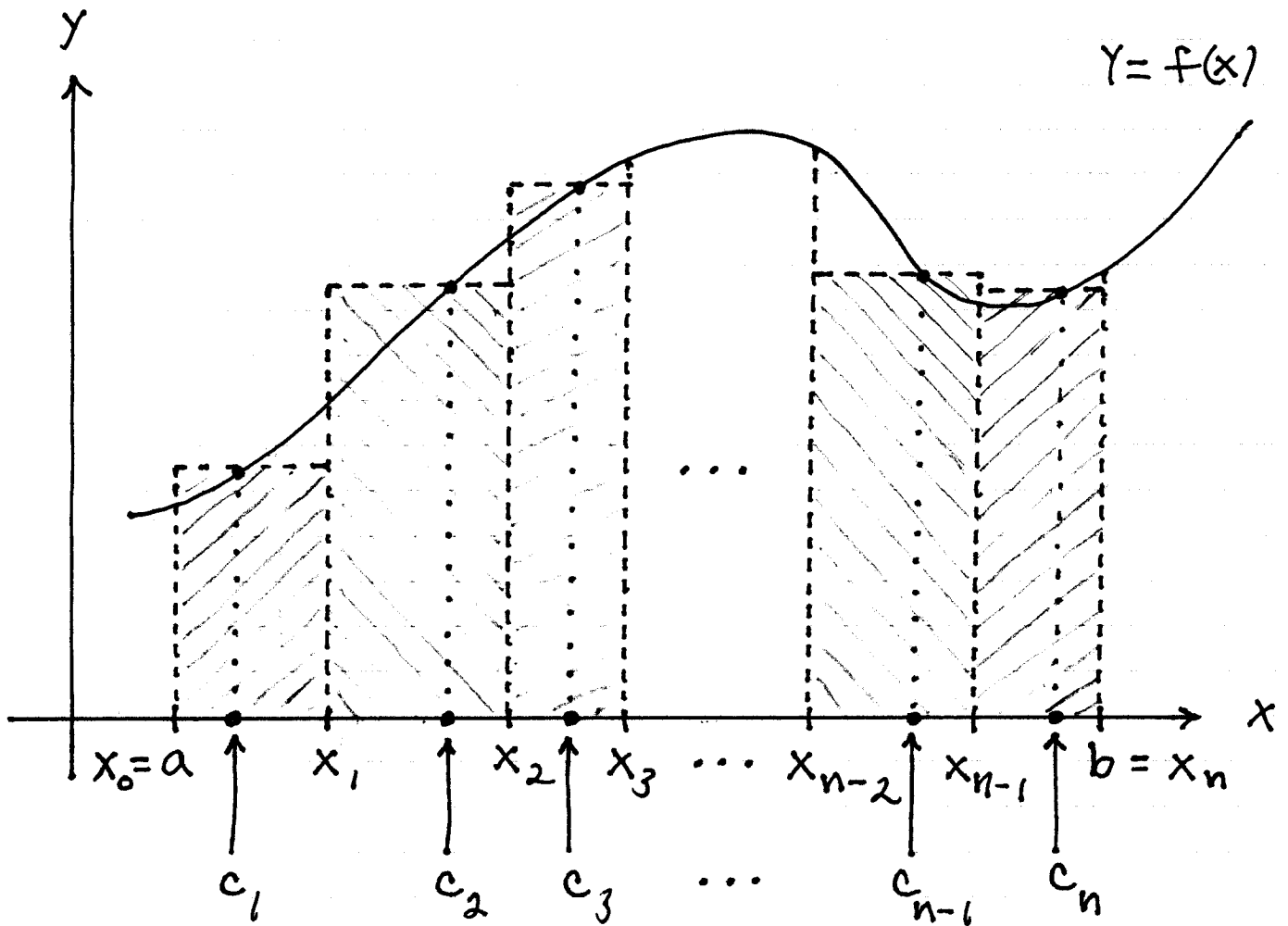


Lecture 2

Limit Definition of Definite Integral



Note: This process allows us to find AREAS of nonstandard shapes.

How to Find a Definite Integral Using the Limit Definition

1.) Divide the interval $[a, b]$ into n equal parts each of length

$$\Delta x_i = \frac{b-a}{n} \quad \text{for } i=1, 2, 3, \dots, n.$$

2.) Let the sampling points be the right-hand endpoints of each subinterval :

$$x_i = a + \frac{(b-a)}{n}i \quad \text{for } i=1, 2, 3, \dots, n.$$

3.) Add the areas of the n rectangles:

$$\sum_{i=1}^n f(x_i) \cdot \Delta x_i$$

4.) The definite integral is :

$$\int_a^b f(x) dx = \lim_{n \rightarrow \infty} \sum_{i=1}^n f(x_i) \Delta x_i$$