6.2-6.3: The Definite Integral

Definitions:

partition-

$\triangle x_i$:

$\|P\|$:

x_i^*:

A *Riemann Sum*

The **definite integral** of a function f from $x = a$ to $x = b$:

(NOTE: If $f(x) \geq 0$ on $[a, b]$, then the definite integral is the area under the graph from $x = a$ to $x = b$).

Examples:

Given $f(x) = 9 - x^2$, write and compute a Riemann Sum to approximate $\int_1^3 f(x)\,dx$ using a partition of $P = \{1, 2, 2.5, 2.8, 3\}$. Let $x_i^* =$ the midpoint of each subinterval.

Equally-spaced partitions: Let n be the number of equally-spaced subintervals of $[a, b]$. Then $\Delta x_i =$

$$\int_a^b f(x)\,dx =$$

Given $f(x) = 9 - x^2$, find the exact value of $\int_1^3 f(x)\,dx$ from the definition.

Properties of Definite Integrals: (pp383-385)
(NOTE: Some of the more useful properties for future sections are #2, 3, 5 and 8).

Examples:

Rewrite $\int_1^5 f(x)\,dx - \int_4^5 f(x)\,dx + \int_4^7 f(x)\,dx$ as a single integral.

Compute $\int_0^3 (x - \sqrt{9-x^2})\,dx$

On Your Own: 6.2 #1,2,3,7,13,23,24; 6.3 #4,7,16,17,21,23,24,27,39-32,45,48