Integral Approximations

Assume that f(x) is continuous over [a, b]. If the number of subintervals between a and b is n,

then

$$\Delta x = \frac{a-b}{n}.$$

If m_i is the midpoint of each subinterval,

Then

$$M_n = \sum_{i=1}^{n} f(m_i)\Delta x.$$

Then

$$\lim_{n\to\infty} \quad M_n = \int_a^b f(x)dx.$$

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then $\Delta x = \frac{a-b}{n}$.

Using endpoints at P = $\{x_0, x_1, \ . \ , x_n\}$,

set $T_n = \frac{\Delta x}{2}[f(x_0) + 2f(x_1) + 2f(x_2) + \ ... \ + 2f(x_{n-1}) + f(x_n)]$.