

Trapezoid Rule

p. 412 - 420 (5.9)

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Let f be continuous on $[a,b]$ with n subintervals of equal width.

Then, the trapezoidal rule for approximating $\int_a^b (f(x)) dx$ is

$$\frac{b-a}{2n} [f(x_0) + 2f(x_1) + 2f(x_2) + \dots + 2f(x_{n-1}) + f(x_n)]$$

and as $n \rightarrow \infty$, the right side approaches $\int_a^b (f(x)) dx$.

**Used because can't use Fundamental Thm. of Calculus, so must approximate...antiderivatives aren't always elementary functions.

1. Use the trapezoidal rule to approximate $\int_0^2 x^3 dx$ for $n = 4$.

**calc. 2. The function f is continuous on $[2, 8]$ and has values that are given in the table below. Using the subintervals $[2, 5]$, $[5, 7]$, and $[7, 8]$, what is the trapezoidal approximation of $\int_2^8 (f(x)) dx$?

x	2	5	7	8
f(x)	10	30	40	20