KNEWTON | alta

Midpoint and Trapezoidal Rule

Learning Objectives

- Approximate the area under a curve using midpoint approximation
- Approximate the area under a curve using trapezoidal approximation

Approximate the area under a curve using midpoint approximation

1. Find the area under the function $f(x) = x^3$ on the interval $[0,2]$ using the midpoint approximation and using $n = 5$ rectangles.

Approximate the area under a curve using trapezoidal approximation

2. Estimate the area under the curve $g(x) = 2^x$ on the interval $[-1,1]$ using trapezoidal approximations with $n = 6$. Round to 4 decimal places.

- Trapezoidal Rule: $\int_a^b f(x)dx \approx \frac{b-a}{2n}[f(x_0) + 2f(x_1) + \cdots + 2f(x_{n-1}) + f(x_n)]$

ANSWER KEY

1. 3.92
2. 2.1737