

EXERCISES 5.1

Area

In Exercises 1–4 use finite approximations to estimate the area under the graph of the function using

- a. a lower sum with two rectangles of equal width.
 - b. a lower sum with four rectangles of equal width.
 - c. an upper sum with two rectangles of equal width.
 - d. an upper sum with four rectangles of equal width.
1. $f(x) = x^2$ between $x = 0$ and $x = 1$.
 2. $f(x) = x^3$ between $x = 0$ and $x = 1$.
 3. $f(x) = 1/x$ between $x = 1$ and $x = 5$.
 4. $f(x) = 4 - x^2$ between $x = -2$ and $x = 2$.

Using rectangles whose height is given by the value of the function at the midpoint of the rectangle's base (*the midpoint rule*) estimate the area under the graphs of the following functions, using first two and then four rectangles.

5. $f(x) = x^2$ between $x = 0$ and $x = 1$.
6. $f(x) = x^3$ between $x = 0$ and $x = 1$.
7. $f(x) = 1/x$ between $x = 1$ and $x = 5$.
8. $f(x) = 4 - x^2$ between $x = -2$ and $x = 2$.