1. Consider the area $A$ of the region that lies under the graph $f(x) = \sqrt{x}$ over the interval $[0, 1]$.

(a) Estimate the area $A$ using four approximating rectangles, i.e., $n = 4$, and by taking the sample points to be

i. left-most points

ii. right-most points
iii. midpoints

(b) Find the exact area $A$ using definite integrals.
2. Consider the area $A$ of the region that lies under the graph $f(x) = \sqrt{x}$ over the interval $[0, 2]$.

   (a) Estimate the area $A$ using three approximating rectangles, i.e., $n = 3$, and by taking the sample points to be

   i. **left-most** points

   ii. **right-most** points
iii. midpoints

(b) Find the exact area $A$ using definite integrals.
3. Consider the area $A$ of the region that lies under the graph $f(x) = \sqrt{x}$ over the interval $[1, 2]$.

(a) Estimate the area $A$ using two approximating rectangles, i.e., $n = 2$, and by taking the sample points to be

i. **left-most** points

ii. **right-most** points
iii. midpoints

(b) Find the exact area \( A \) using definite integrals.