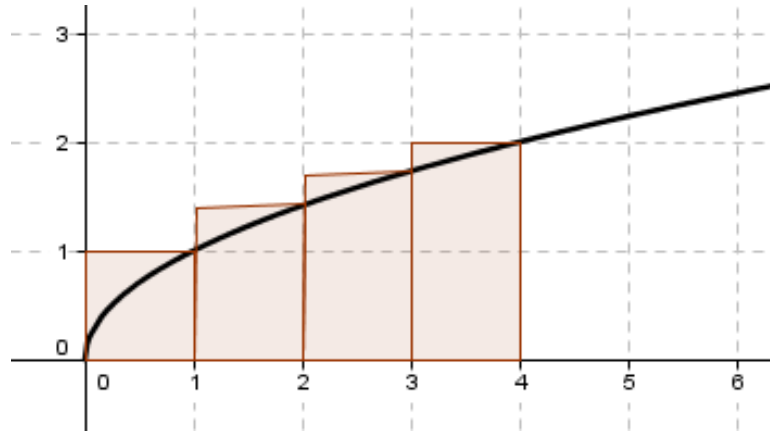


3. Divide the interval $[0, 4]$ into four subintervals of equal length. Then approximate the area under the curve $f(x) = \sqrt{x}$ on $[0, 4]$ sketching the corresponding rectangles using (a) right-end points, and (b) mid-points of each subinterval.

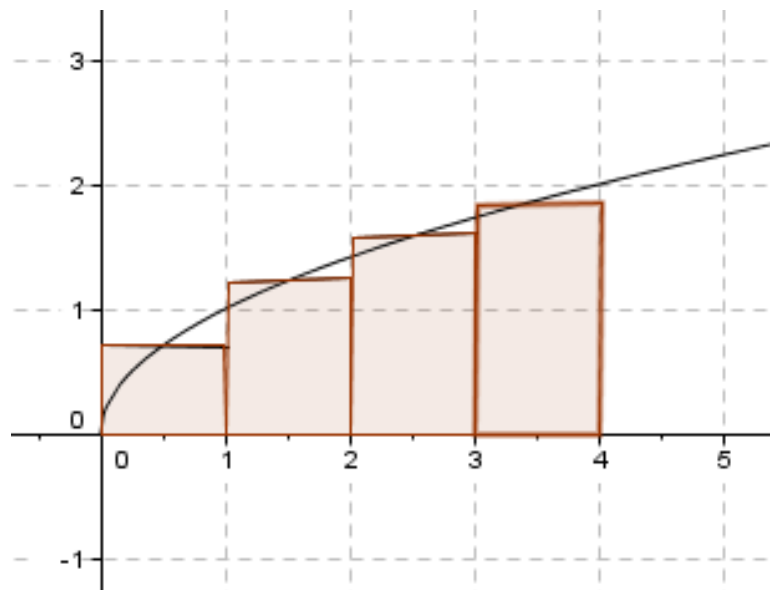
(a) Using right end-points:



Width of each rectangle, $\Delta x = 1$.

So the area $\approx \Delta x [f(1) + f(2) + f(3) + f(4)] = 1(1 + \sqrt{2} + \sqrt{3} + 2) \approx 6.15$.

(b) Using mid-points:



Width of each rectangle, $\Delta x = 1$.

So the area $\approx \Delta x [f(.5) + f(1.5) + f(2.5) + f(3.5)] = 1(\sqrt{.5} + \sqrt{1.5} + \sqrt{2.5} + \sqrt{3.5}) \approx 5.38$.