

Written HW15 – MATH 2501 Fall 2020

Due by 16 November for timely completion credit

In this problem, you will find area under the curve “the long way” using the limit of Riemann sums. For each of these problems, the function involved is $f(x) = 16 - x^2$ and the interval is $[a, b] = [0, 4]$.

- (1) Approximate the area under the curve using a left-endpoints Riemann sum with $n = 3$ rectangles.
- (2) Approximate the area under the curve using a right-endpoints Riemann sum with $n = 3$ rectangles.
- (3) Compute the actual area under the curve by working out $\int_0^4 f(x)dx = \lim_{n \rightarrow \infty} \sum_{k=1}^n f(x_k)\Delta x$, as was done numerous times in class.
- (4) Explain whether your approximations in (1) and (2) were overestimates or underestimates of the actual area under the curve.