

MATH235 Calculus 1
Riemann Sum Homework Problems
11/15/2010

1. Evaluate the definite integral $\int_0^4 4x - x^2 dx$ by following the next steps.

(1) Graph $f(x) = 4x - x^2$ on $[0, 4]$ and approximate the area under the curve by using four rectangles of equal width. Determine the height of each of these rectangles by using the right endpoint of each subinterval.

(2) Estimate the area under the curve by using n rectangles of equal width and the right endpoint of each subinterval.

(3) Evaluate the limit of the Riemann sum that you wrote in (2) and conclude what $\int_0^4 4x - x^2 dx$ is.

2. Evaluate the definite integral $\int_0^2 x^2 - 1 dx$ by following the next steps.

(1) Graph $f(x) = x^2 - 1$ on $[0, 2]$. Estimate the definite integral by using n rectangles of equal width and the left end point of each subinterval. Note that subintervals in $[0, 1]$ will produce rectangles that are under the x -axis, since the function values are negative there. This is OK. Such rectangles will have negative height, and so they will be added to the Riemann sum as negative values.

(2) Evaluate the definite integral $\int_0^2 x^2 - 1 dx$ by finding the limit of the Riemann sum that you wrote in (1).