

Lecture 23 Activity: Areas Under Curves

Ben Logsdon
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In this problem, we will approximate and find the area under the curve $f(x) = x^2$ from $x = 0$ to $x = 2$.

1. Approximate the area using four rectangles with a right endpoint approximation using the following steps.
 - 1.1 What is Δx , the width of each triangle?
 - 1.2 Find the height of each triangle.
 - 1.3 Find the area of each triangle.
 - 1.4 Add all the areas together (You should get 3.75).
2. Approximate the area using n rectangles with a right endpoint approximation using the following steps.
 - 2.1 What is Δx , the width of each triangle? (Your answer should have " n " in it.)
 - 2.2 Consider the triangle number k . What is its left endpoint? What is its right endpoint? What is its height?
 - 2.3 What is the area of triangle number k ?
 - 2.4 Write an expression that adds all the areas together. (You'll need Σ -notation for this.)
 - 2.5 We can make this approximation better by making n bigger, and we can make it perfect by taking the limit as $n \rightarrow \infty$. Write down this limit and evaluate it. (Your answer should be $8/3$.)