Section 5.2
Riemann Sum
0.5 Lectures

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MATHS 101: Calculus 1

Riemann Sum

Question: Find the area under the curve of $f(x) = x^2$ from $[0, 1]$.
Idea: To cover the area by as many rectangles as possible and then we will get better and better estimate if we increase the number of rectangles.

GeoGebra: `https://www.geogebra.org/m/SNS8SYSg`

Question: When will we get an exact estimate for the area?

Answer: When the number of rectangle $\to \infty$. In that case, we write the area by

$$\text{Area} = \int_a^b f(x)\,dx = \lim_{n\to\infty} \left(\frac{b-a}{n}\right) \sum_{k=0}^{n} f(x_k^*)$$

This integral is called definite integral. The number a and b are called the *lower limit and upper limit of integration* respectively.