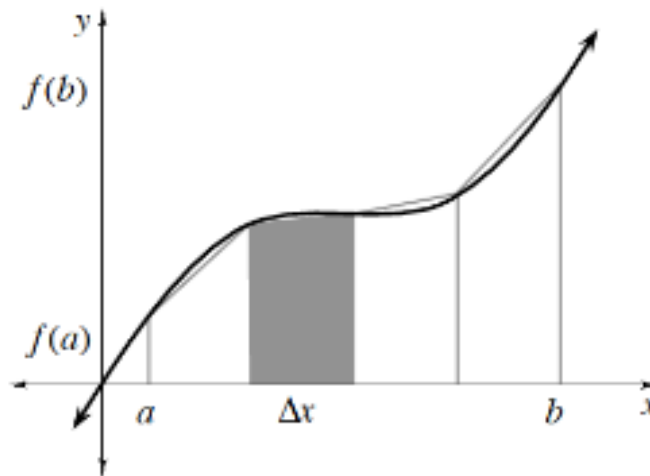# Calculus 2.1 Key Points

Trapezoid Rule:

Formula to approximate the area under a curve with trapezoids:

$$A = \frac{\Delta x}{2}\left(f(a) + 2f(a + \Delta x) + 2f(a + 2\Delta x) + \ldots + 2(f(b - \Delta x) + f(b)\right)$$

Summation/Sigma Notation:

$$\sum_{i=0}^{2}(2i + 3) = [2(0) + 3] + [2(1) + 3] + [2(2) + 3] = 15$$

- The variable below the sigma symbol is called the **index** (i in this case)
- The numbers above & below the sigma symbol set the **upper & lower bounds**, respectively, for the summation (2 and 0 in this case)
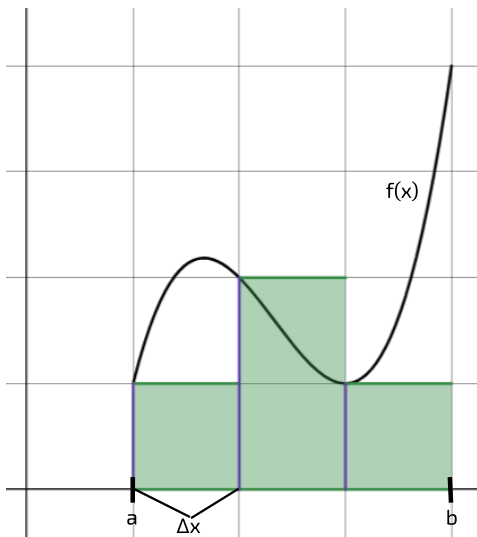- The term to the right of the sigma symbol is called the **argument** ($2i + 3$ in this case)

Calculus 2.1 Key Points

Left & Right Endpoint and Midpoint Rectangles:

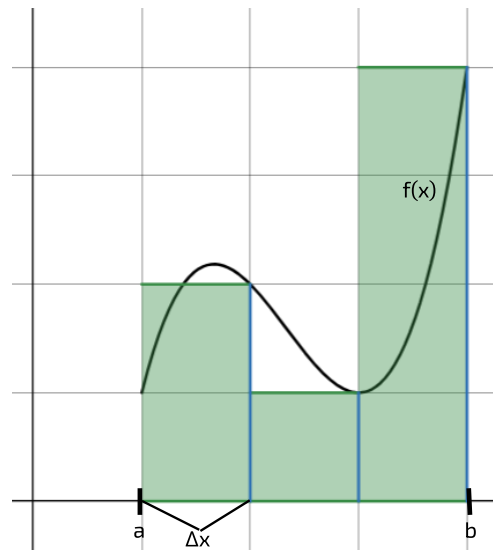We can approximate the area under a curve with a summation of rectangles.

Left Endpoint:

$$\sum_{i=0}^{n-1} [\Delta x \bullet f(a + \Delta x \bullet i)]$$

Right Endpoint:

$$\sum_{i=1}^{n} [\Delta x \bullet f(a + \Delta x \bullet i)]$$

Midpoint: $\sum_{i=0}^{n-1} [\Delta x \bullet f((a + 0.5 \bullet \Delta x) + \Delta x \bullet i)]$