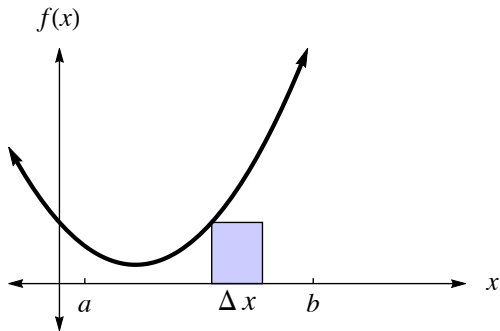


## Approximating Area Using Left Endpoint Rectangles

We can generalize our method for approximating the area under a curve when:

1. We have some function,  $f(x)$ ,
2. The  $x$  values for from  $x = a$  to  $x = b$  (that is,  $a \leq x \leq b$ ),
3. We are using  $n$  left endpoint rectangles,
4. All the rectangles have an equal width,  $\Delta x$ .

Here is an example graph showing one rectangle:



Using summation notation, the approximate area under the curve is given by:

$$A \approx \sum_{i=0}^{n-1} \Delta x \cdot f(a + \Delta x \cdot i)$$

This method of using rectangles to approximate the area under a curve is called a **Riemann Sum**.