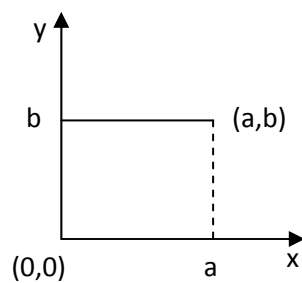


## Area of a Rectangle Proof

The area of a rectangle can be calculated by representing the rectangle on the coordinate plane by bounding it between the x-axis and a function. The function can then be integrated between two endpoints to find the area.

An ideal function to choose is  $f(x) = \text{constant}$  where the constant is the height of the rectangle. The end points of the integral can then be 0, and the length of the rectangle.

Letting  $f(x) = b$ , on a graph this looks like the following:



To find the area of the rectangle we formulate the integral  $\int_0^a f(x) dx$

By solving this integral, we get the formula for calculating the area of a rectangle with length  $a$  and width  $b$

$$\int_0^a f(x) dx = \int_0^a b dx = bx \Big|_0^a = b(a) - b(0) = ab$$

Thus we have proved that the area of a rectangle is the length multiplied by the width.