## Introduction to Definite Integrals

As usual, we'll introduce this topic from a geometric point of view. Geometrically, definite integrals are used to find the area under a curve. Alternately, you can think of them as a "cumulative sum" — we'll see this viewpoint later.
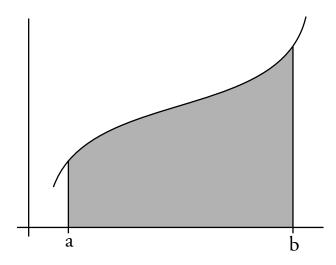


Figure 1: Area under a curve

Figure 1 illustrates what we mean by "area under a curve". The area starts at the left endpoint $x = a$ and ends at the right endpoint $x = b$. The "top" is the graph of $f(x)$ and the "bottom" is the $x$-axis. The notation we use to describe this in calculus is the *definite integral*

$$\int_a^b f(x)dx.$$

The difference between a definite integral and an indefinite integral (or antiderivative) is that a definite integral has specified start and end points.

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