Some parallels in the stories of derivative and integral

	Derivative	Integral
Original motivation	Slope of tangent line for graph of f	Area of region under graph of f
Definition	$f'(x) = \lim_{\Delta x \to 0} \frac{f(x+\Delta x) - f(x)}{\Delta x}$	$\int_a^b f(x)\,dx = \lim_{\Delta x \to 0} \sum_{k=1}^{n} f(x_k^*)\Delta x.$
Interpretations	1. Slope of tangent line for graph of f 2. Rate of change in one quantity with respect to a second	1. Area of region under graph of f 2. Accumulation of one quantity with respect to a second
Rules/tools for computing	1. Derivatives of basic functions (power, trig, exp, log) 2. Rules for combinations of functions (sum, product, quotient, chain)	1. Fundamental Theorem of Calculus 2. Rules for combinations of functions

In first introducing the idea of derivative, we started by thinking about the problem of computing slope of a tangent line. The definition of derivative is motivated by the idea of finding a general way to compute the slope of a tangent line for the graph of a function. In the end, the definition of derivative can stand alone without any interpretation as slope (or rate of change).

A similar story happens for introducing integrals. We start by thinking about the problem of calculating area of a region. The definition of integral is motivated by the idea of finding a general way to compute the area of a region between the graph of a function and the horizontal axis. In the end, the definition of integral can stand alone without any interpretation as area (or accumulation).