Sorting Out Notation / Vocabulary & Understanding The FTC

Symbol	Meaning	How To Calculate	Vocabulary
$\int_a^b f(x)\,dx$ ↑ This is a #.	"Area" between $f(x)$ & x-axis, counting stuff under x-axis as negative	• Riemann Sums • $\int_a^b f(x)\,dx = \lim_{n\to\infty} R_n = \lim_{n\to\infty} L_n$, R_n = right hand Riemann sum w/ n rectangles L_n = Left hand Riemann sum w/ n rectangles • Can approximate by calculating R_n or L_n w/ a specified # for n Ex. $n=4$	Definite Integral
$\int f(x)\,dx$ ↑ This is a function. (technically a "family" of functions)	Antiderivatives of $f(x)$	"Think backwards" from differentiation (and then add $+C$ to make sure we get ALL antiderivatives)	Indefinite Integral
$g(x)=\int_a^x f(t)\,dt$ ↑ This is a function that utilizes the "area" concept	Strange Function inputs x ⟶ outputs an "area under $f(x)$"	Can calculate the derivative of this function by $g'(x) = f(x)$ ↑ replace all t's with x's	Fundamental Theorem of Calculus Part I

↑ This function is an essential part of FTC Part II which relates "areas" to antidifferentiation:

$$\int_a^b f(x)\,dx = F(b) - F(a),$$

where F is an antiderivative of f.