

5.3 The Fundamental Theorem of Calculus

1. FTC part 1: If $f(x)$ is continuous on $[a, b]$, then for $a \leq x \leq b$ the function $g(x) = \int_a^x f(t) dt$ is continuous on $[a, b]$. Also, $g(x)$ is differentiable on (a, b) and $g'(x) = f(x)$
2. Notice that in the equation above we used t as the variable since x is a limit on the integral
3. FTC part 2: If f is continuous on $[a, b]$ then $\int_a^b f(t) dt = F(b) - F(a)$, where F is an antiderivative of f