Math 201

Section 5.6 The Fundamental Theorem of Calculus

Evaluation Theorem

If f is continuous on the interval $[a, b]$, then

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

where F is any antiderivative of f; that is, $F' = f$.

The Fundamental Theorem of Calculus

If f is continuous on $[a, b]$, then the function g defined by

$$g(x) = \int_a^x f(t)dt, \quad a \leq x \leq b,$$

is an antiderivative of f; that is, $g'(x) = f(x)$ for $a < x < b$.

Differentiating and Integrating as Inverse Processes

Suppose f is continuous on $[a, b]$.

1. If $g(x) = \int_a^x f(t)dt$, then $g'(x) = f(x)$.
2. $\int_a^b f(x)dx = F(b) - F(a)$, where F is any antiderivative of f; that is, $F' = f$.