First Fundamental Theorem

$$\frac{d}{dx}\int_a^{g(x)} f(t)\,dt = f\left(g(x)\right)\cdot g'(x)$$

Second Fundamental Theorem

$$\int_a^b f(t)\,dt = F(b) - F(a) \text{ where } F'(x) = f(x)$$

<u>Fundamental Theorem of Calculus:</u>

$$\int_a^b f(x)\,dx = F(b) - F(a), \text{ where } F'(x) = f(x), \text{ or } \frac{d}{dx}\int_a^b f(x)\,dx = f(x).$$

<u>Second Fundamental Theorem of Calculus (Steve's Theorem):</u>

$$\frac{d}{dx}\int_a^x f(t)\,dt = f(x) \quad \text{or} \quad \frac{d}{dx}\int_{h(x)}^{g(x)} f(t)\,dt = g'(x)f(g(x)) - h'(x)f\left(h(x)\right)$$

<u>Fundamental Theorem of Calculus:</u>

$F'(x) = \frac{d}{dx}\int_a^x f(t)\,dt = f(x)$ where $f(t)$ is a continuous function on $[a, x]$.
$\int_a^b f(x)\,dx = F(b) - F(a)$, where F(x) is <u>any</u> antiderivative of f(x).