The Fundamental Theorem of Calculus

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

where $F'(x) = f(x)$

2nd Fundamental Theorem of Calculus

$$\frac{d}{dx}\int_{\#}^{g(x)} f(x)dx = f(g(x)) \cdot g'(x)$$

The Fundamental Theorem of Calculus

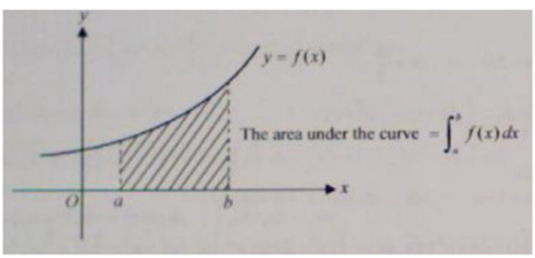
$$\int_a^b f(x)dx = F(b) - F(a)$$

where $F'(x) = f(x)$

FTC I (another version)	FTC II (easy version)
$\int_a^b f'(x)\,dx = f(b) - f(a)$	$y = \int_a^x f(t)dt$ $y' = f(x)$

Definite Integrals (The Fundamental Theorem of Calculus)

A definite integral is an integral with upper and lower limits, *a* and *b*, respectively, that define a specific interval on the graph. A definite integral is used to find the area bounded by the curve and an axis on the specified interval (a, b).



If $F(x)$ is the antiderivative of a continuous function $f(x)$, the evaluation of the definite integral to calculate the area on the specified interval (a, b) is the First Fundamental Theorem of Calculus:

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

First Fundamental Theorem of Calculus:

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

Second Fundamental Theorem of Calculus:

$$\frac{d}{dx}\int_a^x f(t)\,dt = f(x)$$

$$\frac{d}{dx}\int_a^{g(x)} f(t)\,dt = f(g(x))\cdot g'(x) \qquad \textit{Chain Rule Version}$$

Second Fundamental Theorem of Calculus

If a function *f* is continuous on the interval [a, b], let u represent a function of ***x***, then

A. $\frac{d}{dx}\left[\int_a^x f(t)dt\right] = f(x)$

B. $\frac{d}{dx}\left[\int_x^b f(t)dt\right] = -f(x)$

C. $\frac{d}{dx}\left[\int_a^{u(x)} f(t)dt\right] = f(u(x))\cdot u'(x)$