



(Psst! Integration is Antidifferentiation)



The First Fundamental Theorem of Calculus:



$$A = \int_a^b f(x) dx$$

"the integral of $f(x)$ with respect to x on the interval $[a, b]$ "

$\frac{dy}{dx}$

dx

evaluation bar or bracket $F(x) \Big|_a^b$

$$= F(x) \Big|_a^b$$

$$= F(b) - F(a) = \text{Area!}$$

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

F is the antiderivative of f

Antiderivative

Derivative

$\sin x$

$\cos x$

x^2

$\frac{2x^1}{2x^0}$

$2x$

$\frac{1}{4} x^4$

x^3

$\frac{1}{4} x^4 \rightarrow (4x^3) \rightarrow \frac{1}{4} x^4$