

Calculus I

Reference: The notation $F(x)]_a^b$

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We often use the notation

$$F(x)]_a^b = F(b) - F(a)$$

or

$$[F(x)]_a^b = F(b) - F(a)$$

Therefore we can write

$$\int_a^b f(x)dx = F(x)]_a^b$$

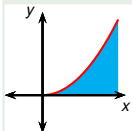
or

$$\int_a^b f(x)dx = [F(x)]_a^b$$

Example

Find the area under the parabola $y = x^2$ from 0 to 1.

- x^2 is continuous on $[0, 1]$ (in fact, it's continuous everywhere).
- An antiderivative of x^2 is $\frac{1}{3}x^3$.



$$\int_0^1 x^2 \, dx = \left[\frac{1}{3}x^3 \right]_0^1 = \frac{1}{3}(1)^3 - \frac{1}{3}(0)^3 = \frac{1}{3}$$

Example



Find the area under the cosine curve from 0 to b , where $0 \leq b \leq \frac{\pi}{2}$.

- $\cos x$ is continuous on $[0, \frac{\pi}{2}]$ (in fact, it's continuous everywhere).
- An antiderivative of $\cos x$ is $\sin x$.

$$\int_0^b \cos x \, dx = [\sin x]_0^b = \sin(b) - \sin(0) = \sin b$$