

Integration (Antidifferentiation) Facts

Integral Properties

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

$$\int_a^a f(x)dx = 0$$

$$\int_a^b kf(x)dx = k \int_a^b f(x)dx$$

$$\int_a^b [f(x) \pm g(x)]dx = \int_a^b f(x)dx \pm \int_a^b g(x)dx$$

$$\int_a^b f(x)dx + \int_b^c f(x)dx = \int_a^c f(x)dx$$

$$\min f \cdot (b-a) \leq \int_a^b f(x)dx \leq \max f \cdot (b-a)$$

$$f(x) \geq g(x) \text{ on } [a, b] \Rightarrow \int_a^b f(x)dx \geq \int_a^b g(x)dx$$

Integral Formulas

$$\int kdx = kx + C$$

$$\int x^n dx = \frac{x^{n+1}}{n+1} + C \quad (n \neq -1)$$

$$\int \frac{1}{x} dx = \ln |x| + C$$

$$\int e^x dx = e^x + C$$

$$\int a^x dx = \frac{a^x}{\ln a} + C$$

$$\int \sin x dx = -\cos x + C$$

$$\int \cos x dx = \sin x + C$$

$$\int \sec^2 x dx = \tan x + C$$

$$* \int \csc^2 x dx = -\cot x + C$$

$$* \int \sec x \tan x dx = \sec x + C$$

$$* \int \csc x \cot x dx = -\csc x + C$$

$$\int \frac{1}{x^2 + 1} dx = \tan^{-1} x + C$$

$$\int \frac{1}{\sqrt{1-x^2}} = \sin^{-1} x + C$$

$$\int f'(g(x))g'(x)dx = f(g(x)) + C$$

$$\int \frac{f'(x)}{f(x)} dx = \ln |f(x)| + C$$

* - not one you need to remember