

* Integrations

1- $\int X^n dx = \frac{X^{n+1}}{n+1} + C$

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

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

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

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

6- $\int \sec x \tan x dx = \sec x + C$

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

$\int \sin(ax+b) dx = \frac{1}{a} * -\cos(ax+b) + C$

$\int \cos(ax+b) dx = \frac{1}{a} * \sin(ax+b) + C$

* definite Integral Properties

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

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

3- $\int_a^b N f(x) dx = N \int_a^b f(x) dx$

4- $\int_a^b f(x) \pm g(x) dx = \int_a^b f(x) dx \pm \int_a^b g(x) dx$

5- $\int_a^b f(x) dx = \int_a^c f(x) dx + \int_c^b f(x) dx$

Alaa Elamin

~~Integration of rational functions~~

• الكامل بالاقواس :-

* الصورة العامة *

$$? \int (f(x) \times g(x)) dx$$

In English

$$\int (f(x))^n f'(x) dx$$

مفقا نأخذ الصورة التالية :-

$$? \int (f(x))^n \times \text{مشتقة القوس} dx$$

steps:-

lets say: $u = f(x)$

$$dx = \frac{du}{f'(x)}$$

⚠ الخطوات :-

نعرضها حسب القوس

$$\frac{dx}{f'(x)}$$

An Example:-

$$\int x (x^2+3)^{10} dx$$

$$\Rightarrow u = x^2+3$$

$$\hookrightarrow du = 2x dx$$

$$\hookrightarrow \frac{du}{2} = x dx$$

$$= \int (u)^{10} \frac{du}{2}$$

$$= \frac{1}{2} \frac{u^{11}}{11} + c$$

$$= \frac{u^{11}}{22} + c$$

* Fundamental Theorem of Calculus

* $f(x)$ is cont on $[a, b]$

If $F(x)$ (anti derivative) Then

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

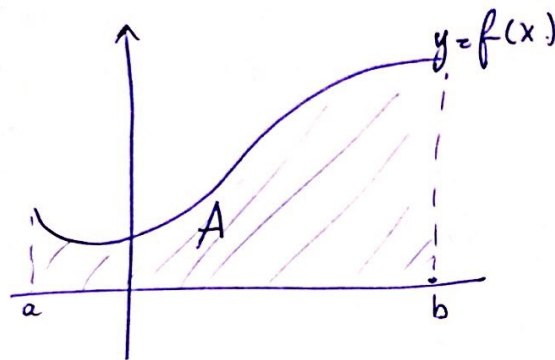
Alaa Ftairi

If $F(x) = \int_a^x f(t) dt$ Then

$$F'(x) = f(x) - f(a)$$

Area

$\int_a^b f(x) dx$ represents the area bounded between the curve $f(x)$ and x -axis iff $f(x) \geq 0$



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