17/03/2021
p. 1878

$n=-1 \quad y=x^{-1}=\frac{1}{x}$

$D\ln x=\frac{1}{x} \sim x\neq 0$

$\downarrow$ CE $x>0$

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

① $De^x=e^x$ $\quad \boxed{\int e^x dx=e^x+K}$

② $Da^x=a^x \ln a \rightarrow \int a^x dx=\int a^x \ln a\, dx$

$a^x+C=\ln a \int a^x dx$

$$\boxed{\int a^x dx=\frac{1}{\ln a}a^x+K}$$

③ $D\operatorname{sen}x=\cos x$ $\quad \boxed{\operatorname{sen}x+K=\int \cos x\, dx}$

④ $D\cos x=-\operatorname{sen}x$ $\quad \cos x+K=-\int \operatorname{sen}x\, dx$

$$\boxed{\int \operatorname{sen}x\, dx=-\cos x+K}$$

⑤ $D\tan x=\frac{1}{\cos^2 x}$ $\quad \int \tan x\, dx=\int \frac{1}{\cos^2 x}dx$

⑥ $D\operatorname{cotan}x$

P 1900 n 106

$$\int e^{x+2}\,dx = \int e^x e^2\,dx = e^2\int e^x\,dx = e^2 e^x + K$$

(e^2: costante)

$$= \boxed{e^{x+2} + K}$$

n 109

$$\int 2^{4x}\,4^{1-2x}\,dx = \int 2^{4x}\,2^{2(1-2x)}\,dx = \int 2^{4x+2-4x}\,dx = \int 4\,dx$$

$$= \boxed{4x + K}$$

n 116

$$\int (2-3^x)^2\,dx = \int (4 - 4\,3^x + 3^{2x})\,dx = 4\int dx - 4\int 3^x\,dx + \int 3^{2x}\,dx =$$

$$= 4x - 4\frac{3^x}{\ln x} + \int 9^x\,dx = \boxed{4x - \frac{4}{\ln 3}\,3^x + \frac{1}{\ln 9}\,9^x + K}$$

P 1901 n 131

$$\int \frac{5\sin x + 2\sin 2x}{\sin x}\,dx = \int (5 + 4\cos x)\,dx = 5\int dx + 4\int \cos x\,dx$$

$$= \boxed{5x + 4\sin x + K}$$

n 133

$$\int \frac{\cos 2x}{4\cos^2 x}\,dx = \int \frac{\cos^2 x - \sin^2 x}{4\cos^2 x}\,dx = \int \frac{2\cos^2 x - 1}{4\cos^2 x}\,dx$$

$$= \int \left(\frac{1}{2} - \frac{1}{4}\,\frac{1}{\cos^2 x}\right)dx = \frac{1}{2}\int dx - \frac{1}{4}\int \frac{1}{\cos^2 x}\,dx =$$

$$= \boxed{\frac{1}{2}x - \frac{1}{4}\tan x + K}$$

m 137

$$\int \frac{1}{\cos^2 x \sin^2 x}\,dx = \int \frac{\sin^2 x + \cos^2 x}{\sin^2 x \cos^2 x}\,dx = \int \left(\frac{1}{\cos^2 x} + \frac{1}{\sin^2 x}\right) dx$$

$$= \boxed{\tan x - \operatorname{cotan} x + K}$$

19/03/2021

p 1901 m 140

$$\int \left(1 - \frac{6}{\sqrt{9-9x^2}}\right) dx = \int dx - 6\int \frac{1}{3\sqrt{1-x^2}}\,dx = \boxed{x - 2\arcsin x + K}$$

$$= x + 2\arccos x + K$$

m 146

$$\int \frac{1+2x^2}{1+x^2}\,dx \Rightarrow \text{trasformo} \rightarrow \left| \frac{1+2x^2}{1+x^2} = \frac{2(x^2)+1}{1+x^2} = \frac{2(x^2+1-1)+1}{1+x^2} \right.$$

$$\left. = \frac{2(x^2+1)-2+1}{1+x^2} = \frac{2(x^2+1)-1}{1+x^2} \right.$$

$$\left. = \frac{2\cancel{(x^2+1)}}{\cancel{1+x^2}} - \frac{1}{1+x^2} \right|$$

$$= \int \left(2 - \frac{1}{1+x^2}\right) dx = \int 2\,dx - \int \frac{1}{1+x^2}\,dx$$

$$= \boxed{2x - \arctan x + K}$$

x metodo 2 (divisione tra polinomi)

$$\begin{array}{l|l} 2x^2+0x+1 & x^2+1 \\ \hline -2x^2 \quad -2 & 2 \\ \hline // \quad // \quad -1 & \end{array}$$

$$2x^2+1 = 2(x^2+1) - 1$$