01/12

→ Riferimenti...

[Pag. 105 es. 170/171/173/174]

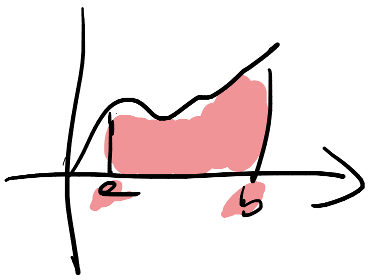
170 $\int \frac{x^2}{\sqrt[3]{x^3+1}}\,dx$ $\left[\frac{1}{2}\sqrt[3]{(x^3+1)^2}+c\right]$

$\int f(x) \rightsquigarrow \int_a^b f(x)$

INDEFINITO? DEFINITO (A e B)

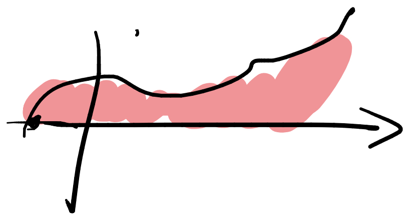
RAGGRUPPA TUTTO (SOMMATORIA)

$\int_a^b f(x) \to$



(AREA TRA A e B)

$\int f(x) \to$



TUTTA L'AREA, NON SOLO A e B

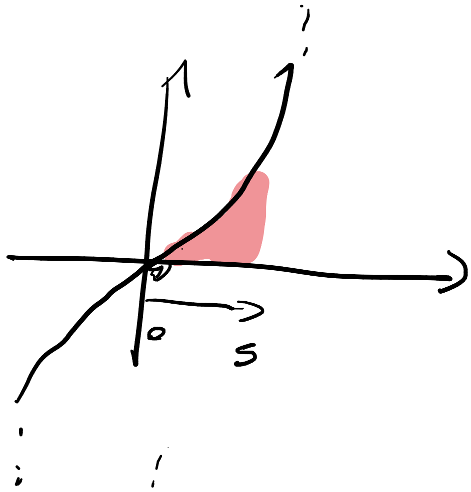
INTEGRALE INDEFINITO

$\exists$ = esiste $\nexists$

`$ \exists $` `$ \notexists $` `\nexist`

LATEX (LING. MATEMATICO) ←

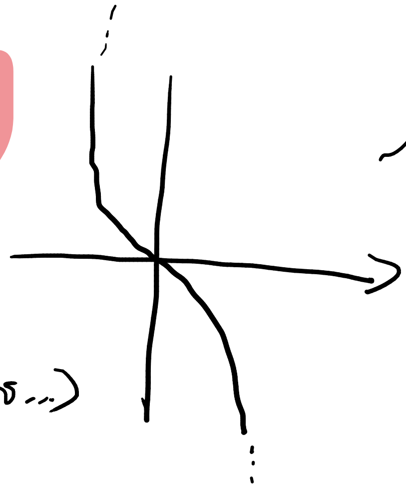
$$\int_a^b \tan(x) \rightarrow$$



$$\int_0^5 \tan(x) \rightarrow \frac{1}{\cos^2(x)}$$

$$[5]-[0] = \left[\frac{1}{\cos(5)}^{-1}\right]$$

$$\int \operatorname{arccotan}(x) \rightarrow$$



(OPPOSTO DELLA TANGENTE...)

SINTESI LOGICA DI INTEGRALE

---

170 $\int \frac{x^2}{\sqrt[3]{x^3+1}}\,dx \rightarrow f(x)$ $\quad\left[\frac{1}{2}\sqrt[3]{(x^3+1)^2}+c\right]$

LI GUARDO E NOTO ↓ x^2 DERIV. DI x^3

$f(x) = x^3 \rightarrow 3x^2$ (DERIVATA)

$\sqrt[3]{\ } \rightarrow x^{1/3}$

REASONING ...

$$\int \frac{x^2}{\sqrt[3]{x^3+1}}\,dx = \int \frac{x^2}{(x^3+1)^{1/3}}\,dx$$

REASONING

$$\int x^2\,dx \qquad \int (x^3+1)^{-1/3}\,dx \qquad \left[-\frac{1}{3}+1=\frac{-1+3}{3}=\frac{2}{3}\right]$$

$$= \left[x^2 \to (2+1)\,x^{(2+1)} \to \cancel{3}x^3\right]$$

$$\frac{x^3}{3}\cdot\left[\frac{(x^3+1)^{2/3}}{2/3}\right] \leftarrow$$

INT. POTENZE

$$\left\{ \left[x^2 \to \frac{x^3}{3}\right] \quad -\frac{1}{3}+1=\frac{-1+3}{3}=\frac{2}{3} \right\}$$

$$\left[\frac{\cancel{x^3}}{\cancel{3}_1}\cdot\frac{\cancel{3}^1}{2}\frac{\sqrt[3]{(x^3+1)^2}}{\cancel{x^3}}+C\right] \to \text{RIS.}$$

$$= \frac{1}{2}\sqrt[3]{(x^3+1)^2}+C$$

---

171 $\displaystyle\int \frac{x}{\sqrt{x^2+10}}\,dx$ $\left[\sqrt{x^2+10}+c\right]$

Then $du=(x^2+10)'\,dx=2x\,dx$ (steps can be seen here), and we have that $x\,dx=\frac{du}{2}$.

Thus,

$$\int \frac{x}{\sqrt{x^2+10}}\,dx=\int \frac{1}{2\sqrt{u}}\,du$$

$$x^2 \to \frac{d}{dx}=2x$$

$$t=2x$$

$$\left\{ x=\frac{1}{2}\,dt \quad t=(x^2+10)' \quad t=2x \right\}$$

$$\left[\to \int \frac{1}{2\sqrt{t}}\right] =$$

$$\int \frac{1}{2\sqrt{t}} = \frac{1}{2}\int \frac{1}{\sqrt{t}} = \frac{1}{2}\int t^{-1/2}$$

$$= \frac{1}{2}\left(\frac{t^{1/2}}{1/2}\right) = \frac{1}{\cancel{2}}\cdot\cancel{2}\sqrt{t}$$

$$= \sqrt{x^2+10} + c$$

$$\int \frac{x^2}{\sqrt[3]{x^3+1}}\,dx \qquad t = (x^3+1) \qquad dt = 3x^2$$

$\rightarrow$ POGLI IL GROSSO

$$\left(x^2 = \frac{dt}{3}\right) \rightarrow x = \sqrt{\frac{1}{3}}$$

$$\int \frac{x^2}{\sqrt[3]{\underbrace{(x^3+1)}_{t}}} \quad x^2 \rightarrow \frac{1}{3} \quad \rightarrow \int \frac{1}{3\sqrt{t}} = \frac{1}{3}\int \frac{1}{\sqrt{t}}$$

$$= \frac{1}{3}\int t^{-1/2} = \frac{1}{3}\left(\frac{t^{1/2}}{1/2}\right)$$

$$= \frac{1}{3}\,\frac{\sqrt{t}}{1/2} = \underbrace{\frac{2}{3}\sqrt{x^3+1}}$$

RIBUTTIAMO DENTRO t

MORALE = USA IL CAMBIO DI VARIABILE!