INTEGRALI

FUNZIONI

- COSTANTE $\rightarrow$ $\int 2\,dx = \underline{2\int dx}$

LA PORTI FUORI

$= 2 + C$ $\rightarrow$ COSTANTE DI INTEGRAZIONE

- POTENZA $\rightarrow$ ① $\int x^3\,dx = \dfrac{x^4}{4} + C$

② $\int \dfrac{1}{x^3} = \int x^{(-3)}$ ESPONENTE NEGATIVO = FRAZIONE

$= \dfrac{x^{-3+1}}{-3+1} = \dfrac{x^{-2}}{-2}$

③ $\int \sqrt[3]{x} = \int x^{1/3}\,dx = \dfrac{x^{1/3+1}}{1/3+1}$

RADICE $\rightarrow$ DIVENTA FRAZIONE SU "x"

$= \dfrac{x^{4/3}}{\frac{4}{3}}$ DOPPIA DIVISIONE = PRODOTTO

$= x^{4/3} \cdot \dfrac{3}{4}$

$= \sqrt[3]{x^4} \cdot \dfrac{3}{4}$

④ $\int \dfrac{1}{\sqrt[3]{x}}\,dx = \int x^{-1/3} = \dfrac{x^{-1/3+1}}{-1/3+1}$ ....

$= \dfrac{3}{2}\sqrt[3]{x^2} + C$

– ESPONENZIALE

$$\int e^x \, dx = e^x + c$$

$$\int e^{x^2} dx = e^{x^2} \cdot \frac{x^3}{3} + c$$

COMPOSTA

– LOGARITMO

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

$$\int \frac{1}{x^4} = \ln|x^4| + c$$

– SENO

$$\int \operatorname{sen}(x) = -\cos(x) + c$$

– COSENO

$$\int \cos(x) = -\operatorname{sen}(x) + c$$

10 $$\int \frac{1}{x^2} dx = \int x^{-2} = \frac{x^{-1}}{-1} = -1 \cdot x^{-1}$$

$$= -\frac{1}{x} + c$$

13 $\int \sqrt{x}\,dx = \int x^{1/2} = \dfrac{x^{1/2+1}}{1/2+1} = \dfrac{2}{3}x\sqrt{x}+C$

14 $\int \sqrt[3]{x}\,dx = \int x^{1/3}dx = \dfrac{x^{1/3+1}}{1/3+1} = \dfrac{3}{4}x\sqrt[3]{x}+C$

$$\int e^{5-3x} e^{3x}dx = e^{5-3x}\cdot\int(5-3x)+C\cdot e^{3x}\cdot\int 3x$$

$$= e^{5-3x}\cdot\int 5-\int 3x\cdot e^{3x}\cdot\int 3x$$

$$= e^{5-3x}\cdot 5x-3\int x\cdot e^{3x}\cdot 3\int x$$

$$= e^{5-3x}\cdot 5x-\frac{3x^2}{2}\cdot e^{3x}\cdot\frac{3x^2}{2}$$

$$\int 5x^4 = 5\int x^4 = \frac{\cancel{5}x^5}{\cancel{5}} = x^5+C$$

193 $\int x e^{x^2}dx = \int x^1\cdot\int e^{x^2}$

$$= \frac{x^2}{2}\cdot e^{x^2}\int x^2$$

$$= \frac{x^2}{2}\cdot e^{x^2}\cdot\frac{x^3}{3}+C$$

44 $\int \frac{x^2+2}{x^3}\,dx$ $= \int \frac{\cancel{x^2}}{\cancel{x^3}} + \int \frac{2}{x^3}$

$= \int \frac{1}{x} + \int \frac{2}{x^3}$

$= \ln(x) + 2\int \frac{1}{x^3}$

$= \ln(x) + 2\int x^{-3}$

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

39 $\int (x^2+1)(x+1)\,dx$ $= \int x^3 + x^2 + x + 1\,dx$

$= \int x^3 + \int x^2 + \int x + \int 1\,dx$

$= \frac{x^4}{4} + \frac{x^3}{3} + \frac{x^2}{2} + x + C$

$(a-b)^2 = a^2 + b^2 - 2ab$

51 $\int \frac{(x^2-1)^2}{x^2}\,dx$ $= \int \frac{x^4 + 1 - 2x^2}{x^2}$

$= \int \frac{\cancel{x^4}^{2}}{\cancel{x^2}} + \int \frac{1}{x^2} - \int \frac{2\cancel{x^2}}{\cancel{x^2}} = \int x^2 + \int x^{-2} - 2\int dx$

$= \frac{x^3}{3} - \frac{1}{x} - 2x + C$