# INTEGRALI

19 mar '21

## esercizi

$$\int 1 - \frac{6}{\sqrt{9-9x^2}}\,dx = \int dx - 2\int \frac{1}{\sqrt{1-x^2}} = x - 2\arcsin x + k$$

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

privilegiamo il denominatore $D$
e smuoviamo il numeratore per farlo diventare $k \cdot D + u$

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

$$= 2x - \arctan x + k$$

si poteva fare la divisione tra polinomi:

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

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

$$\int \left[ \frac{\sqrt{1+x}}{\sqrt{1-x}} + \frac{\sqrt{1-x}}{\sqrt{1+x}} \right] dx = \int \frac{1+x+1-x}{\sqrt{1-x^2}}\, dx = 2\int \frac{1}{\sqrt{1-x^2}}\, dx =$$

$$= 2 \arcsin x + K$$

$$\int \frac{4x^2-1}{2x^2+2}\, dx = \frac{1}{2}\int \frac{4(x^2+1)-5}{x^2+1}\, dx = 2\int dx - \frac{5}{2}\int \frac{1}{x^2+1}\, dx =$$

$$= 2x - \frac{5}{2}\arctan x + K$$

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

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

$$= \frac{1}{4}\cdot\frac{1}{3}x^3 - \frac{1}{4}x + \frac{1}{4}\arctan x + k = \frac{x^3}{12} - \frac{x}{4} + \frac{\arctan x}{4} + k$$