INTEGRALI

1) $\int x^p\ dx\ = \frac{x^{p+1}}{p+1} + c \qquad (p \in \mathbb{R}, \quad p \neq -1)$
2) $\int \frac{1}{x}\ dx\ = \ln|x| + c$
3) $\int a^x\ dx\ = \frac{a^x}{\ln a} + c$
4) $\int e^x\ dx\ = e^x + c$
5) $\int \sin x\ dx\ = -\cos x + c$
6) $\int \cos x\ dx\ = \sin x + c$
7) $\int \frac{1}{\cos^2 x}\ dx\ = \tan x + c$
8) $\int \frac{1}{\sin^2 x}\ dx\ = -\cot x + c$
9) $\int \frac{1}{1+x^2}\ dx\ = \arctan x + c$
10) $\int \frac{1}{\sqrt{1 \quad x^2}}\ dx\ = \arcsin x + c$
11) $\int \sinh x\ dx\ = \cosh x + c$
12) $\int \cosh x\ dx\ = \sinh x + c$
13) $\int \frac{1}{\sqrt{1+x^2}}\ dx\ = \text{settsinh} x + c = \ln(x + \sqrt{1+x^2}) + c$
14) $\int \frac{1}{\sqrt{x^2 \quad 1}}\ dx\ = \ln|x + \sqrt{x^2-1}| + c$

DERIVATE

1) $D(x^p) = px^{p \quad 1} \quad (p \in \mathbb{R})$
2) $D(a^x) = a^x \ln a$
3) $D(e^x) = e^x$
4) $D(\log_a x) = \frac{1}{x} \log_a e$
5) $D(\ln x) = \frac{1}{x}$
6) $D(\sin x) = \cos x$
7) $D(\cos x) = -\sin x$
8) $D(\tan x) = \frac{1}{\cos^2 x} = 1 + \tan^2 x$
9) $D(\cot x) = -\frac{1}{\sin^2 x} = -1 - \cot^2 x$
10) $D(\arcsin x) = \frac{1}{\sqrt{1 \quad x^2}}$
11) $D(\arccos x) = -\frac{1}{\sqrt{1 \quad x^2}}$
12) $D(\arctan x) = \frac{1}{1+x^2}$
13) $D(\sinh x) = \cosh x$
14) $D(\cosh x) = \sinh x$
15) $D(\text{settsinh} x) = \frac{1}{\sqrt{1+x^2}}$
16) $D(\text{settcosh} x) = \frac{1}{\sqrt{x^2 \quad 1}}$

SVILUPPI DI McLAURIN

1) $e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + ... + \frac{x^n}{n!} + o(x^n)$

2) $\ln(1+x) = x - \frac{x^2}{2} + \frac{x^3}{3} + ... + (-1)^{n\ \ 1}\frac{x^n}{n} + o(x^n)$

3) $\sin x = x - \frac{x^3}{3!} + \frac{x^5}{5!} + ... + (-1)^n \frac{x^{2n+1}}{(2n+1)!} + o(x^{2n+2})$

4) $\cos x = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} + ... + (-1)^n \frac{x^{2n}}{(2n)!} + o(x^{2n+1})$

5) $\tan x = x + \frac{x^3}{3} + \frac{2x^5}{15} + o(x^6)$

6) $\arcsin x = x + \frac{x^3}{6} + \frac{3x^5}{40} + o(x^6)$

7) $\arccos x = \frac{\pi}{2} - \arcsin x$

8) $\arctan x = x - \frac{x^3}{3} + \frac{x^5}{5} + ... + (-1)^n \frac{x^{2n+1}}{2n+1} + o(x^{2n+2})$

9) $\sinh x = x + \frac{x^3}{3!} + \frac{x^5}{5!} + ... + \frac{x^{2n+1}}{(2n+1)!} + o(x^{2n+2})$

10) $\cosh x = 1 + \frac{x^2}{2!} + \frac{x^4}{4!} + ... + \frac{x^{2n}}{(2n)!} + o(x^{2n+1})$

11) $(1+x)^\alpha = 1 + \alpha x + \frac{\alpha(\alpha\ \ 1)}{2!}x^2 + \frac{\alpha(\alpha\ \ 1)(\alpha\ \ 2)}{3!}x^3 + ... + \binom{\alpha}{n}x^n + o(x^n)$

11a) $\frac{1}{1+x} = 1 - x + x^2 - x^3 + ... + (-1)^n x^n + o(x^n)$

11b) $\frac{1}{\sqrt{1+x}} = 1 - \frac{x}{2} + \frac{3x^2}{8} - \frac{5x^3}{16} + \frac{35x^4}{128} + o(x^4)$

11c) $\sqrt{1+x} = 1 + \frac{x}{2} - \frac{x^2}{8} + \frac{x^3}{16} - \frac{5x^4}{128} + o(x^4)$

TRIGONOMETRIA

1) $\sin(p+q) = \sin p \cos q + \cos p \sin q$

2) $\sin(p-q) = \sin p \cos q - \cos p \sin q$

3) $\cos(p+q) = \cos p \cos q - \sin p \sin q$

4) $\cos(p-q) = \cos p \cos q + \sin p \sin q$

5) $\sin(2p) = 2 \sin p \cos p$

6) $\cos(2p) = \cos^2 p - \sin^2 p$

7) $\sin \frac{p}{2} = \pm\sqrt{\frac{1\ \ \cos p}{2}}$

8) $\cos \frac{p}{2} = \pm\sqrt{\frac{1+\cos p}{2}}$

9) $\sin p \cos q = \frac{1}{2}\left[\sin(p+q) + \sin(p-q)\right]$

10) $\sin p \sin q = \frac{1}{2}\left[\cos(p-q) - \cos(p+q)\right]$

11) $\cos p \cos q = \frac{1}{2}\left[\cos(p-q) + \cos(p+q)\right]$

12) $\sin p + \sin q = 2 \sin \frac{p+q}{2} \cos \frac{p\ \ q}{2}$

13) $\sin p - \sin q = 2 \cos \frac{p+q}{2} \sin \frac{p\ \ q}{2}$

14) $\cos p + \cos q = 2 \cos \frac{p+q}{2} \cos \frac{p\ \ q}{2}$

15) $\cos p - \cos q = -2 \sin \frac{p+q}{2} \sin \frac{p\ \ q}{2}$.

Formule parametriche

Posto $\quad t = \tan\frac{x}{2}$:

1) $\sin x = \frac{2t}{1+t^2}$
2) $\cos x = \frac{1\quad t^2}{1+t^2}$
3) $\tan x = \frac{2t}{1\quad t^2}$

FUNZIONI IPERBOLICHE

Relazioni fondamentali

1) $\sinh x := \dfrac{e^x - e^{\quad x}}{2}$
2) $\cosh x := \dfrac{e^x + e^{\quad x}}{2}$
3) $\tanh x := \dfrac{e^x - e^{\quad x}}{e^x + e^{\quad x}} = \dfrac{e^{2x} - 1}{e^{2x} + 1} = \dfrac{1 - e^{\quad 2x}}{1 + e^{\quad 2x}}$
4) $\cosh^2 x - \sinh^2 x = 1$
5) $\cosh 2x = \cosh^2 x + \sinh^2 x$
6) $\sinh 2x = 2 \sinh x \cosh x$