DERIVATE FONDAMENTALI

1. $D[c] = 0 \quad \forall c \in \Re$	**17.** $D[\text{sen}x] = \cos x$
2. $D[c \cdot f(x)] = c \cdot D[f(x)] \quad \forall c \in \Re$	**18.** $D[\cos x] = -\text{sen}x$
3. $D[x^\alpha] = \alpha \cdot x^{\alpha-1} \quad \forall \alpha \in \Re$	**19.** $D[\text{tg}x] = \frac{1}{\cos^2 x} = 1+\text{tg}^2 x$
4. $D[a\,x] = a \quad \forall a \in \Re$	**20.** $D[\text{cotg}\,x] = -\frac{1}{\text{sen}^2 x} = -\left(1+\text{cotg}^2 x\right)$
5. $D\left[\frac{1}{x}\right] = -\frac{1}{x^2}$	**21.** $D[\text{arcsen}\,x] = \frac{1}{\sqrt{1-x^2}}$
6. $D\left[\frac{1}{x^\alpha}\right] = D[x^{-\alpha}] = -\alpha \cdot x^{-\alpha-1} = -\frac{\alpha}{x^{\alpha+1}}$	**22.** $D[\arccos x] = -\frac{1}{\sqrt{1-x^2}}$
7. $D[\sqrt{x}] = \frac{1}{2\cdot\sqrt{x}}$	**23.** $D[\text{arctg}\,x] = \frac{1}{1+x^2}$
8. $D\left[\sqrt[n]{x^k}\right] = D\left[x^{\frac{k}{n}}\right] = \ldots$ si risolve come 3.	**24.** $D[\text{arccotg}\,x] = -\frac{1}{1+x^2}$
9. $D\left[\frac{c}{\sqrt[n]{x^k}}\right] = c \cdot D\left[x^{-\frac{k}{n}}\right] = \ldots$ si risolve come 3.	**25.** $D[\text{senh}\,x] = \cosh x$
10. $D[e^x] = e^x$	**26.** $D[\cosh x] = \text{senh}\,x$
11. $D[a^x] = a^x \cdot \ln a$	**27.** $D[\text{tgh}x] = \frac{1}{\cosh^2 x} = 1-\text{tgh}^2 x$
12. $D[\ln x] = \frac{1}{x}$	**28.** $D[\text{cotgh}\,x] = -\frac{1}{\text{senh}^2 x} = 1-\text{cotgh}^2 x$
13. $D[\log_a x] = \frac{1}{x \cdot \ln a}$	**29.** $D[\text{sett senh}\,x] = \frac{1}{\sqrt{x^2+1}}$
14. $D[\log_a \lvert x\rvert] = \frac{1}{x \cdot \ln a}$	**30.** $D[\text{sett cosh}\,x] = \frac{1}{\sqrt{x^2-1}}$
15. $D[\lvert x\rvert] = \frac{\lvert x\rvert}{x} = \frac{x}{\lvert x\rvert} = \begin{cases} +1 & \text{se } x>0 \\ -1 & \text{se } x<0 \end{cases}$	**31.** $D[\text{sett tgh}\,x] = \frac{1}{1-x^2}$
16. $D[x^x] = D\left[e^{\ln(x^x)}\right] = D\left[e^{x\cdot\ln x}\right] = x^x \cdot D[x \cdot \ln x]$	**32.** $D[\text{sett cotgh}\,x] = \frac{1}{1-x^2}$

Derivata di una somma algebrica: $D[f(x) \pm g(x)] = f'(x) \pm g'(x)$

Derivata di un prodotto: $D[f(x) \cdot g(x)] = f'(x) \cdot g(x) + f(x) \cdot g'(x)$

Derivata di un rapporto: $D\left[\frac{f(x)}{g(x)}\right] = \frac{f'(x) \cdot g(x) - f(x) \cdot g'(x)}{g^2(x)}$

Derivata di un prodotto tra *n* funzioni:
$D[f_1(x) \cdot f_2(x) \cdot \ldots \cdot f_n(x)] = f'_1(x) \cdot f_2(x) \cdot \ldots \cdot f_n(x) + f_1(x) \cdot f'_2(x) \cdot \ldots \cdot f_n(x) + \ldots + f_1(x) \cdot f_2(x) \cdot \ldots \cdot f'_n(x)$

Derivata di una funzione composta: $D[f(g(x))] = f'(g(x)) \cdot g'(x)$