DERIVATE FONDAMENTALI

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

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: $D\left[\dfrac{f(x)}{g(x)}\right]=\dfrac{f'(x)\cdot g(x)-f(x)\cdot g'(x)}{g^2(x)}$

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: $D\,[f(g(x))]=f'(g(x))\cdot g'(x)$