UNA **FUNZIONE COMPOSTA** É COSTITUITA DA UNA FUNZIONE CHE AL POSTO DELLA x HA UN'ALTRA FUNIONE

$$f(x) \longrightarrow f[g(x)]$$

ES: $f(x) = \sin x \longrightarrow y = \sin(3x^2-5)$

dove $g(x) = 3x^2-5$

OCCORRE INDIVIDUARE QUELLA INTERNA ($g(x)$)

$\sqrt{\sin x}$

g

$\sin x$ interna g

$\sqrt{g}$ esterna

$y = e^{x^2-2}$ g

x^2-2 interna g

e^g esterna

REGOLA :

$$D\, f(g) = f' \cdot g'$$

ESERCIZI

281) $y = e^{4x} \longrightarrow 4x = g$

$e = f$

$y' = f' \cdot g' = \underbrace{e^{4x}}_{f'} \cdot 4 \rightarrow g'$

282) $y = \ln(2x^2 - x) \longrightarrow 2x^2 - x = g$

$\ln = f$

$y' = f' \cdot g' = \underbrace{\frac{1}{(2x^2-x)}}_{f'} (4x-1) \rightarrow g'$

Calcola la derivata delle seguenti funzioni.

281	$y = e^{4x}$	$[y' = 4e^{4x}]$
282	$y = \ln(2x^2 - x)$	$\left[y' = \frac{4x-1}{2x^2-x}\right]$
283	$y = e^{\frac{2x}{x-1}}$	$\left[y' = -\frac{2e^{\frac{2x}{x-1}}}{(x-1)^2}\right]$
284	$y = e^{x^2-3x}$	$[y' = e^{x^2-3x}(2x-3)]$
285	$y = e^{-x}$	$[y' = -e^{-x}]$
286	$y = 5\ln(x^2+3)$	$\left[y' = \frac{10x}{x^2+3}\right]$
287	$y = \ln(x^2-1) + 5$	$\left[y' = \frac{2x}{x^2-1}\right]$
288	$y = e^{x^2-2}$	$[y' = 2xe^{x^2-2}]$
289	$y = \ln(x^4 - 3x^2)$	$\left[y' = \frac{4x^2-6}{x^3-3x}\right]$
290	$y = \ln\frac{1-x}{1+x}$	$\left[y' = \frac{2}{x^2-1}\right]$
291	$y = \sin 5x$	$[y' = 5\cos 5x]$
292	$y = \cos x^3$	$[y' = -3x^2 \sin x^3]$
293	$y = 3\cos 4x$	$[y' = -12\sin 4x]$
294	$y = \tan 4x^4$	$\left[y' = \frac{16x^3}{\cos^2 4x^4}\right]$
295	$y = \cot 5x$	$\left[y' = -\frac{5}{\sin^2 5x}\right]$
296	$y = \tan(3x^2 - 2)$	$\left[y' = \frac{6x}{\cos^2(3x^2-2)}\right]$
297	$y = 5\sin x^4$	$[y' = 20x^3 \cos x^4]$
298	$y = \cot(x^3+1)$	$\left[y' = -\frac{3x^2}{\sin^2(x^3+1)}\right]$
299	$y = e^{2x} + 2e^{-x}$	$[y' = 2(e^{2x} - e^{-x})]$
300	$y = 4\ln 3x + \ln x$	$\left[y' = \frac{5}{x}\right]$
301	$y = \sqrt{2x} + \sqrt{e^{2x}+1}$	$\left[y' = \frac{1}{\sqrt{2x}} + \frac{e^{2x}}{\sqrt{e^{2x}+1}}\right]$
302	$y = \ln(2\ln x)$	$\left[y' = \frac{1}{x\ln x}\right]$
303	$y = e^{-\sqrt{x}}(2 - \sqrt{x})$	$\left[y' = \frac{e^{-\sqrt{x}}(\sqrt{x}-3)}{2\sqrt{x}}\right]$
304	$y = \ln\tan x + \ln\cos x$	$\left[y' = \frac{1}{\tan x}\right]$

284) $y = e^{x^2-2}$

$x^2-2 = g$

$y = e^{g}$

$y' = f' \cdot g' = \underbrace{e^{x^2-2}}_{f'} \cdot \underbrace{(2x)}_{g'}$

283) $y = e^{\frac{2x}{x-1}}$

$\frac{2x}{x-1} = g$

e^{g}

$y' = f' \cdot g' = \underbrace{e^{\frac{2x}{x-1}}}_{f'} \cdot \underbrace{\frac{2(x-1)-2x\cdot 1}{(x-1)^2}}_{g'} =$

$= e^{\frac{2x}{x-1}} \cdot \underbrace{\frac{-1}{(x-1)^2}}_{g'}$

291) $y = \sin 5x$

$5x = g$

$\sin g$

$y' = \underbrace{\cos 5x}_{f'} \cdot \underbrace{(5)}_{g'}$

292) $y = \cos x^3$

$\rightarrow y' = \underbrace{-\sin x^3}_{f'} \cdot \underbrace{3x^2}_{g'}$