$(x^n)' = n \cdot x^{n-1}$ $(cf(x)+dg(x)) = cf'(x)+dg'(x)$ $(e^x)' = e^x$ $(\log x)' = \frac{1}{x}$

$(\sin x)' = \cos x$, $(\cos x)' = \sin x$

① $6x^4 + 2\cos x + e^x + 6\sin x$ $24x^3 - 2\sin x + e^x + 6\cos x$

② $7\cos x + 3e^{-x} + 2\log x + 7$ $-7\sin x + 3e^x + \frac{2}{x}$

③ $6\cos x + 7\sin x + 8x^7 + 9x^6 + 11$

$-6\sin + 7\cos x + 56x^6 + 54x^5$

sin 미분 → cos

cos 미분 → -sin

$2x = 2x$?

① 미분한다는 뜻

$(x^6)' = 6x^5$

$4x^3 = 4 \times 3\, x^{3-1}$

$(x^{-3})' = \left(\frac{1}{x^3}\right)' = -3x^{-4} = \frac{1}{x^4} = x^{-4}$

$(2x^{-5} + 6x^2)' = -10x^{-6} + 12x^1$

product rule (곱의 법칙)

$(f(x) \cdot g(x))' = f'(x)g(x) + f(x)g'(x)$ 예) $(3x^{10}+5)' = 5$

$x^3 = x^2 \cdot x$ $2x^2 + x^2 \cdot 1 = \frac{2x^3+x^2}{3x^2}$

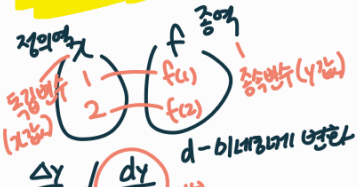
↳ $3x^2$

$e^{3x} = (e^x)^3 = e^x \cdot e^x \cdot e^x$

$(2^2)^3 = 2^6$ $= e^x \cdot e^{2x} + e^x e^x e^x + e^x e^x e^x$

$= 3e^x$

chain Rule (연쇄법칙)



d-비네라이니 변환

$\frac{\Delta y}{\Delta x}$ / $\frac{dy}{dx}$ 미분

$\frac{dx}{dt}$ - 종속변수 / $\frac{dx}{dt}$ - 독립변수 → $x = f(t)$

$x = 2t^2 + 2t$

$\frac{dx}{dt} = 2 \times 2t^{2-1} + 2$?

치환

$z = e^{3x}$ 합성: x 종속 / 미분

$y = 3x$

$z = e^y$

$\frac{dz}{dx} = \frac{dz}{dy} = \frac{dy}{dx}$

e^{3x} 3

$= e^{3x} \cdot 3$

① $y = \cos 2x$ $\quad 2x = r$

$\frac{dy}{dx} = ? = \frac{dy}{dr} = \frac{dr}{dx}$ ($\frac{dr}{dx} = 2$) $\quad \cos r = y$

$\frac{dy}{dx} = -\sin r = -2\sin 2x$

② $y = \sin 2t$

$\frac{dy}{dt} = ?$

$2t = p \Rightarrow \frac{dp}{dt} = 2$

$y = \sin p$

$\frac{dy}{dp} = \cos p$

$\frac{dy}{dt} = \frac{dy}{dp} = \frac{dy}{dt}$ ($\cos p = \cos 2t$, -2)

③ $v = \log(2x^2+6x+7)$

$\frac{du}{dx} = ?$

$4x+6 = kim$

$2x^2+6x+7 = kim$

$\frac{du}{dx} = \frac{du}{dkim} \frac{dkim}{dx}$

$\frac{du}{dkim} = \frac{1}{kim}$ $\left(\frac{1}{2x^2+6x+7}\right)$

과제

$t = \log(6x + \cos 3x)$

$\frac{dt}{dx}$