20210808
TREEPAT

① $f(x) = (x+1)^3$ find $\frac{d}{dx} f^{-1}(x)$

$f(x) = (x+1)^3$

$x = \sqrt[3]{f(x)} - 1$

$f^{-1}(x) = \sqrt[3]{x} - 1$

$\frac{d}{dx} f^{-1}(x) = \frac{1}{3} x^{-2/3}$ #

② $f(x) = \frac{(x+1)^2 (x^2+1)^{1/2}}{(2x-1)^3}$ ; $x > \frac{1}{2}$ find $\frac{d}{dx} f(x)$

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

$\frac{d}{dx} \ln u = \frac{1}{u}\frac{du}{dx}$ ; $\frac{d}{dx} \ln f(x) = \frac{f'(x)}{f(x)} = \frac{2}{x+1} + \frac{1}{2(x^2+1)} - \frac{3}{2x-1}$

$f'(x) = f(x)\left(\frac{2}{x+1} + \frac{1}{2(x^2+1)} - \frac{3}{2x-1}\right)$ #