Урок 5, задание 5

$y = \ln\left(x + \sqrt{x^2+1}\right)$

$\frac{d}{dx}\left(\ln\left(\sqrt{x^2+1}+x\right)\right) = \frac{d\ln(a)}{da}\frac{da}{dx}$, $a = \sqrt{x^2+1}$; $\frac{d}{da}\ln a = \frac{1}{a}$

$\rightarrow \frac{\frac{d}{dx}\left(x+\sqrt{x^2+1}\right)}{x+\sqrt{x^2+1}} \rightarrow \frac{\frac{d}{dx}\left(\sqrt{x^2+1}\right)+1}{x+\sqrt{x^2+1}} \rightarrow$

$\rightarrow \frac{d}{dx}\left(\sqrt{x^2+1}\right) = \frac{d\sqrt{a}}{da}\frac{da}{dx}$, $a = x^2+1$; $\frac{d}{da}\left(\sqrt{a}\right) = \frac{1}{2\sqrt{a}}$

$\rightarrow \frac{1+\left(\frac{\frac{d}{dx}(x^2+1)}{2\sqrt{x^2+1}}\right)}{x+\sqrt{x^2+1}} \rightarrow \frac{1+\frac{d}{dx}(x^2)+\frac{d}{dx}(1)\cdot\frac{1}{2\sqrt{x^2+1}}}{x+\sqrt{x^2+1}} \rightarrow$

$\rightarrow \frac{1+\frac{\frac{d}{dx}(x^2)+0}{2\sqrt{x^2+1}}}{x+\sqrt{x^2+1}} \rightarrow \frac{d}{dx}(x^n) = nx^{n-1}\ (n=2) \rightarrow \frac{d}{dx}(x^2) = 2x$

$\rightarrow \frac{1+2x\cdot\frac{1}{2\sqrt{x^2+1}}}{x+\sqrt{x^2+1}} \rightarrow \frac{1+\frac{x}{\sqrt{x^2+1}}}{x+\sqrt{x^2+1}} \rightarrow \frac{1}{\sqrt{x^2+1}}$ ответ