

Задание 5

$$y = x \sqrt{1+x^2}$$

$$\frac{d}{dx} (x \sqrt{1+x^2}) = \frac{2x^2+1}{2\sqrt{1+x^2}}$$

$$\rightarrow \frac{d}{dx} (b \cdot a) = b \frac{da}{dx} + a \frac{db}{dx}, \quad b = x \quad a = \sqrt{1+x^2}$$

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

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

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

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

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

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

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

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

order