# Čisté derivace

$$f(x) = \ln \frac{1+\sqrt{x^4+1}}{x^2}$$

$$f'(x) = \frac{1}{\frac{1+\sqrt{x^4+1}}{x^2}} \cdot \frac{\frac{1}{\cancel{2}\sqrt{x^4+1}}\cdot \cancel{4}x^3 \cdot x^2 - (1+\sqrt{x^4+1})\cdot 2x}{x^4} =$$

$$= \frac{\cancel{x^2}}{1+\sqrt{x^4+1}} \cdot \frac{\frac{2x^5}{\sqrt{x^4+1}} - 2x\,(1+\sqrt{x^4+1})}{\cancel{x^4}} =$$

$$= \frac{1}{1+\sqrt{x^4+1}} \cdot \frac{\frac{2x^5}{\sqrt{x^4+1}} - 2x\,(1+\sqrt{x^4+1})}{x^2} = \frac{1}{1+\sqrt{x^4+1}} \cdot \left(\frac{2\cancel{x^5}}{\sqrt{x^4+1}} \cdot \frac{1}{\cancel{x^2}} - \right.$$

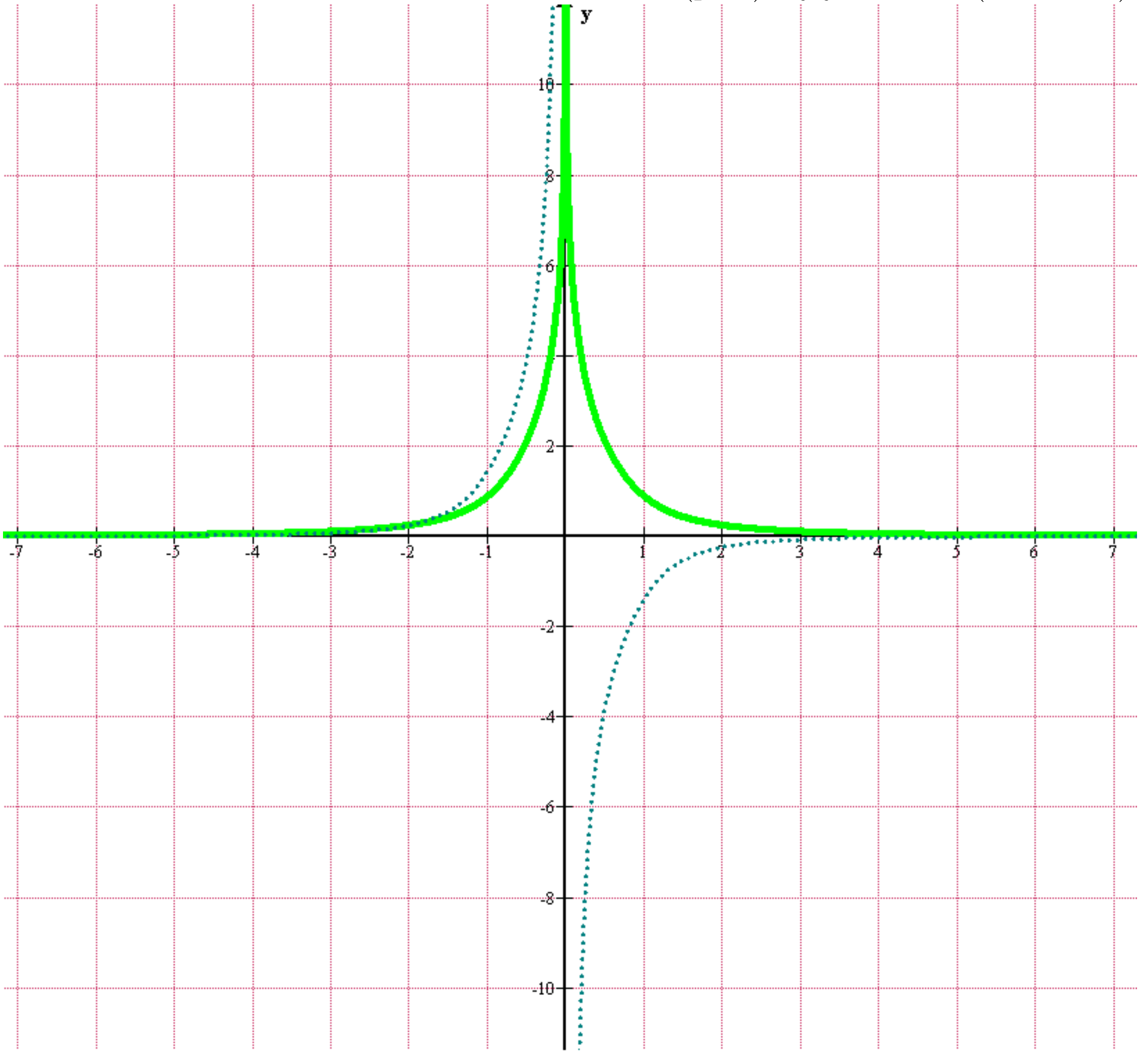
$$\left. - \frac{2\cancel{x}\,(1+\sqrt{x^4+1})}{\cancel{x^2}}\right) = \frac{1}{1+\sqrt{x^4+1}} \cdot \left(\frac{2x^3}{\sqrt{x^4+1}} - \frac{2(1+\sqrt{x^4+1})}{x}\right) =$$

$$= \frac{1}{1+\sqrt{x^4+1}} \cdot \frac{2x^4 - 2\,(1+\sqrt{x^4+1})\cdot\sqrt{x^4+1}}{x\sqrt{x^4+1}} = \frac{1}{1+\sqrt{x^4+1}} \cdot \frac{2x^4 - 2\sqrt{x^4+1} - 2(x^4+1)}{x\cdot\sqrt{x^4+1}} =$$

$$= \frac{1}{1+\sqrt{x^4+1}} \cdot \frac{\cancel{2x^4} - 2\sqrt{x^4+1} - \cancel{2x^4} - 2}{x\cdot\sqrt{x^4+1}} = \frac{1}{\cancel{1+\sqrt{x^4+1}}} \cdot \frac{-2\,(\cancel{\sqrt{x^4+1}+1})}{x\sqrt{x^4+1}} =$$

$$= \frac{-2}{x\cdot\sqrt{x^4+1}}$$

Obrázek 1. Grafické znázornění zadané funkce (plná) a její derivace (tečkovaná)




Zdroj: program Graph