

Čistá derivace + zjednodušení

$$f(x) = \ln \sqrt{\frac{2 + \sin^2 5x}{2 - \sin^2 5x}} \quad (\sin 5x)^2$$

$$f'(x) = \frac{1}{\frac{\sqrt{2 + \sin^2 5x}}{\sqrt{2 - \sin^2 5x}}} \cdot \frac{1}{2 \cdot \sqrt{\frac{2 + \sin^2 5x}{2 - \sin^2 5x}}}$$

$$= \frac{(0 + 2 \sin 5x \cdot \cos 5x \cdot 5) \cdot (2 - \sin^2 5x) - (2 + \sin^2 5x) \cdot (0 - 2 \sin 5x \cdot \cos 5x \cdot 5)}{(2 - \sin^2 5x)^2}$$

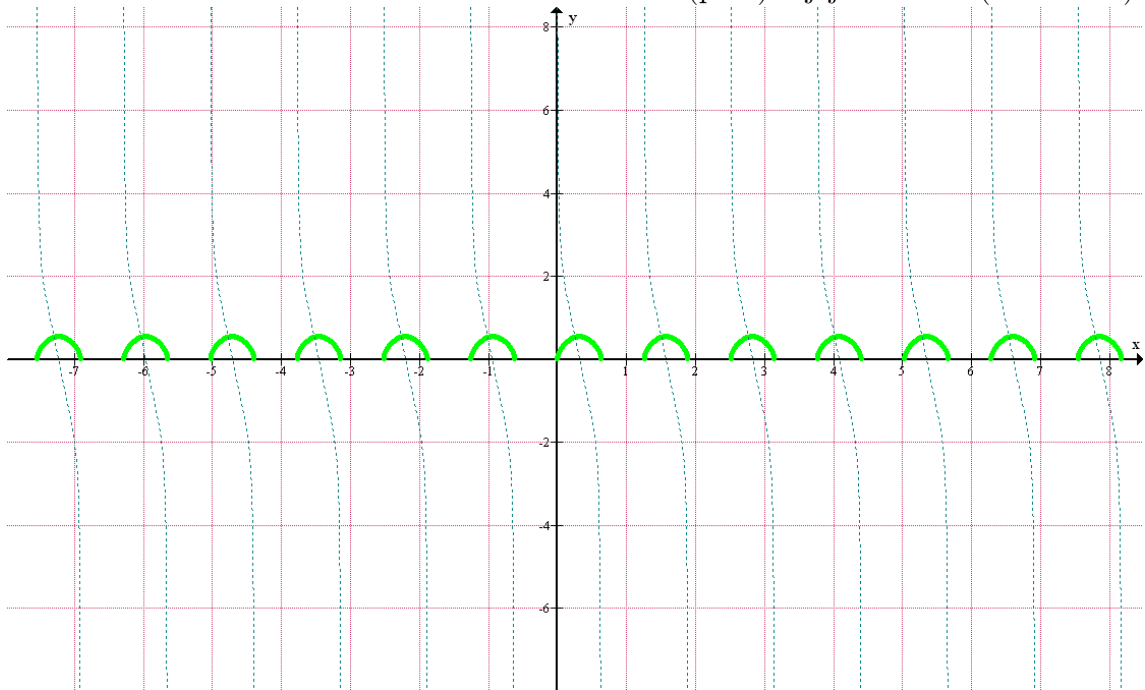
$$= \frac{\sqrt{2 - \sin^2 5x}}{\sqrt{2 + \sin^2 5x}} \cdot \frac{\sqrt{2 - \sin^2 5x}}{2 \sqrt{2 + \sin^2 5x}} \cdot \frac{10 \sin 5x \cdot \cos 5x \cdot (2 - \sin^2 5x) + 10 \sin 5x \cdot \cos 5x \cdot (2 + \sin^2 5x)}{(2 - \sin^2 5x)^2}$$

$$= \frac{10 \sin 5x \cos 5x [(2 - \sin^2 5x) + (2 + \sin^2 5x)]}{2(2 + \sin^2 5x)(2 - \sin^2 5x)} = \frac{5 \sin 5x \cdot \cos 5x \cdot [4]}{(2 + \sin^2 5x)(2 - \sin^2 5x)}$$

$$= \frac{20 \sin 5x \cdot \cos 5x}{(2 + \sin^2 5x) \cdot (2 - \sin^2 5x)}$$

$$= \frac{20 \cdot \sin 5x \cdot \cos 5x}{4 - 2 \sin^2 5x + 2 \sin^2 5x - \sin^4 5x} = \frac{20 \cdot \sin 5x \cdot \cos 5x}{4 - \sin^4 5x}$$

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



Zdroj: program Graph