



GA01 Matematika I

Derivace složené funkce

$$11.2.2. f : y = \frac{1}{\sqrt{1 + \cos x}} - \frac{1}{\sqrt{2}} \ln \sqrt{\frac{\sqrt{2} + \sqrt{1 + \cos x}}{\sqrt{2} - \sqrt{1 + \cos x}}} + \cos^2 \left(\frac{\pi}{2} - 1 \right)$$

$$\begin{aligned} y &= \frac{1}{\sqrt{1 + \cos x}} - \frac{1}{\sqrt{2}} \ln \sqrt{\frac{\sqrt{2} + \sqrt{1 + \cos x}}{\sqrt{2} - \sqrt{1 + \cos x}}} + \cos^2 \left(\frac{\pi}{2} - 1 \right) = \\ &= \frac{1}{\sqrt{1 + \cos x}} - \frac{1}{2\sqrt{2}} (\ln(\sqrt{2} + \sqrt{1 + \cos x}) - \ln(\sqrt{2} - \sqrt{1 + \cos x})) + \cos^2 \left(\frac{\pi}{2} - 1 \right) \end{aligned}$$

$$\begin{aligned} y' &= -\frac{1}{2} (1 + \cos x)^{-\frac{3}{2}} (-\sin x) - \frac{1}{2\sqrt{2}} \left(\frac{(1 + \cos x)^{-\frac{1}{2}} (-\sin x)}{2(\sqrt{2} + \sqrt{1 + \cos x})} - \frac{-(1 + \cos x)^{-\frac{1}{2}} (-\sin x)}{2(\sqrt{2} - \sqrt{1 + \cos x})} \right) = \\ &= \frac{\sin x}{2(1 + \cos x)\sqrt{1 + \cos x}} + \frac{1}{4\sqrt{2}} \left(\frac{\frac{\sin x}{\sqrt{1 + \cos x}}}{\sqrt{2} + \sqrt{1 + \cos x}} + \frac{\frac{\sin x}{\sqrt{1 + \cos x}}}{\sqrt{2} - \sqrt{1 + \cos x}} \right) = \\ &= \frac{\sin x}{2(1 + \cos x)\sqrt{1 + \cos x}} + \frac{1}{4\sqrt{2}} \left(\frac{\frac{\sin x(\sqrt{2} - \sqrt{1 + \cos x})}{\sqrt{1 + \cos x}} + \frac{\sin x(\sqrt{2} + \sqrt{1 + \cos x})}{\sqrt{1 + \cos x}}}{2 - 1 - \cos x} \right) = \\ &= \frac{\sin x}{2(1 + \cos x)\sqrt{1 + \cos x}} + \frac{1}{2 \cdot 2\sqrt{2}} \left(\frac{2\sqrt{2} \sin x}{(1 - \cos x)\sqrt{1 + \cos x}} \right) = \\ &= \frac{\sin x(1 - \cos x) + \sin x(1 + \cos x)}{2(1 + \cos x)(1 - \cos x)\sqrt{1 + \cos x}} = \frac{2 \sin x}{2(1 - \cos^2 x)\sqrt{1 + \cos x}} = \frac{\sin x}{\sin^2 x \sqrt{1 + \cos x}} = \\ &= \frac{1}{\sin x \sqrt{1 + \cos x}} \end{aligned}$$