

$$\begin{aligned}f'(x) &= -\frac{1}{\sqrt{1-\frac{(1-x)^2}{(1+x)^2}}} \cdot \frac{-(1+x)-(1-x)}{(1+x)^2} = -\frac{1+x}{\sqrt{(1+x)^2-(1-x)^2}} \cdot \frac{-2}{(1+x)^2} = \\&= \frac{2}{(1+x)\sqrt{4x}} = \frac{1}{(1+x)\sqrt{x}} = \frac{\sqrt{x}}{x(1+x)}\end{aligned}$$