Calculus I, Section 3.4, #26
The Chain Rule

Find the derivative of the function.[1]

$$s(t) = \sqrt{\frac{1+\sin(t)}{1+\cos(t)}}$$

$$s(t) = \sqrt{\frac{1+\sin(t)}{1+\cos(t)}} = \left(\frac{1+\sin(t)}{1+\cos(t)}\right)^{1/2} \leftarrow \text{outside function}$$

inside function

$$\begin{aligned}
\frac{\mathrm{d}s}{\mathrm{d}t} &= \frac{1}{2}\left(\frac{1+\sin(t)}{1+\cos(t)}\right)^{1/2-1} \cdot \frac{(1+\cos(t))\cdot\cos(t) - (1+\sin(t))\cdot -\cos(t)}{(1+\cos(t))^2} \\
&= \frac{1}{2}\left(\frac{1+\sin(t)}{1+\cos(t)}\right)^{-1/2} \frac{\cos(t)+\cos^2(t)+\sin(t)+\sin^2(t)}{(1+\cos(t))^2} \\
&= \frac{1}{2}\frac{(1+\sin(t))^{-1/2}}{(1+\cos(t))^{-1/2}}\frac{\cos(t)+\sin(t)+1}{(1+\cos(t))^2} \\
&= \frac{1}{2}\frac{(1+\cos(t))^{1/2}}{(1+\sin(t))^{1/2}}\frac{\cos(t)+\sin(t)+1}{(1+\cos(t))^2} \\
&= \frac{\cos(t)+\sin(t)+1}{2\sqrt{1+\sin(t)}\,(1+\cos(t))^{3/2}}
\end{aligned}$$

[1] Stewart, *Calculus, Early Transcendentals*, p. 204, #26.