

$$\begin{aligned}
\mathbf{8.10} \quad (\cot(x))' &= \left( \frac{\cos(x)}{\sin(x)} \right)' = \frac{(\cos(x))' \sin(x) - \cos(x) (\sin(x))'}{\sin^2(x)} \\
&= \frac{-\sin^2(x) - \cos^2(x)}{\sin^2(x)} = -\frac{\sin^2(x) + \cos^2(x)}{\sin^2(x)} = -\frac{1}{\sin^2(x)} \\
&= -\frac{\sin^2(x)}{\sin^2(x)} - \frac{\cos^2(x)}{\sin^2(x)} = -1 - \left( \frac{\cos(x)}{\sin(x)} \right)^2 = -1 - \cot^2(x)
\end{aligned}$$