1. Calculate the derivative of $\csc \theta$

**Solution:** We want to calculate $f'(\theta)$ where $f(\theta) = \csc \theta = \frac{1}{\sin \theta}$. By the quotient rule, $f'(\theta) = -\frac{(\sin \theta)'}{(\sin \theta)^2}$. We know $(\sin \theta)' = \cos \theta$, so $f'(\theta) = -\frac{\cos \theta}{\sin^2 \theta} = -\csc \theta \cot \theta$. 