

Q1) If $y = \log_{\sin x}(\tan x)$, then $\left(\frac{dy}{dx}\right) \Big|_{\pi/4}$

Solution: $y = \frac{\log \tan x}{\log \sin x}$

$$\Rightarrow \frac{dy}{dx} = \frac{\log_{\sin x} \left(\frac{\sec^2 x}{\tan x} \right) - (\log \tan x) (\cot x)}{(\log \sin x)^2}$$

$$\Rightarrow \frac{dy}{dx} \Big|_{\pi/4} = \frac{-4}{\log 2}$$