

Exercise 12

Differentiate.

$$y = \frac{\cos x}{1 - \sin x}$$

SolutionUse the quotient rule to differentiate y .

$$\begin{aligned}y' &= \frac{dy}{dx} \\&= \frac{d}{dx} \left(\frac{\cos x}{1 - \sin x} \right) \\&= \frac{\left[\frac{d}{dx}(\cos x) \right] (1 - \sin x) - \left[\frac{d}{dx}(1 - \sin x) \right] (\cos x)}{(1 - \sin x)^2} \\&= \frac{(-\sin x)(1 - \sin x) - (-\cos x)(\cos x)}{(1 - \sin x)^2} \\&= \frac{-\sin x + \sin^2 x + \cos^2 x}{(1 - \sin x)^2} \\&= \frac{-\sin x + 1}{(1 - \sin x)^2} \\&= \frac{1}{1 - \sin x}\end{aligned}$$