

Exercise 4

Write the composite function in the form $f(g(x))$. [Identify the inner function $u = g(x)$ and the outer function $y = f(u)$.] Then find the derivative dy/dx .

$$y = \sin(\cot x)$$

Solution

Here $f(x) = \sin x$ and $g(x) = \cot x$ so that $f(g(x)) = \sin(\cot x)$. Take the derivative now.

$$\begin{aligned} y' &= \frac{d}{dx}[\sin(\cot x)] = [\cos(\cot x)] \cdot \frac{d}{dx}(\cot x) \\ &= [\cos(\cot x)] \cdot (-\csc^2 x) \\ &= -(\csc^2 x) \cos(\cot x) \end{aligned}$$