

3.5.12

Differentiate  $y = \frac{\cos(x)}{1 + \sin(x)}$

Solution

By the Derivative Quotient Rule (Theorem 3.3.11) we have

$$\frac{dy}{dx} = \frac{[-\sin x](1 + \sin x) - (\cos x)[0 + \cos x]}{(1 + \sin x)^2}$$

$$= \frac{-\sin x - \sin^2 x - \cos^2 x}{(1 + \sin x)^2} = \frac{-\sin x - (\sin^2 x + \cos^2 x)}{(1 + \sin x)^2}$$

$$= \frac{-\sin x - 1}{(1 + \sin x)^2} = \frac{-(1 + \sin x)}{(1 + \sin x)^2} = \frac{-1}{1 + \sin x}$$

□