

Calculus I, Section 3.3, #12  
Derivatives of Trigonometric Functions

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Differentiate.<sup>1</sup>

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

If  $y = \frac{\cos(x)}{1 - \sin(x)}$ , then

$$\begin{aligned} \frac{dy}{dx} &= \frac{(1 - \sin(x)) \cdot (\cos(x))' - \cos(x) \cdot (1 - \sin(x))'}{(1 - \sin(x))^2} \\ &= \frac{(1 - \sin(x)) \cdot -\sin(x) - \cos(x) \cdot -\cos(x)}{(1 - \sin(x))^2} \\ &= \frac{-\sin(x) + \sin^2(x) + \cos^2(x)}{(1 - \sin(x))^2} \\ &= \frac{1 - \sin(x)}{(1 - \sin(x))^2} \\ &= \frac{1}{1 - \sin(x)} \end{aligned}$$

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<sup>1</sup>Stewart, *Calculus, Early Transcendentals*, p. 196, #12.