

Exercise 10

Differentiate.

$$y = \sin \theta \cos \theta$$

SolutionUse the product rule to differentiate y .

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