Exercise 6

Differentiate.

$$g(\theta) = e^{\theta}(\tan\theta - \theta)$$

Solution

Use the product rule to differentiate $g(\theta)$.

$$\begin{aligned} g'(\theta) &= \frac{d}{d\theta}[g(\theta)] \\ &= \frac{d}{d\theta}[e^{\theta}(\tan\theta - \theta)] \\ &= \left[\frac{d}{d\theta}(e^{\theta})\right](\tan\theta - \theta) + e^{\theta}\left[\frac{d}{d\theta}(\tan\theta - \theta)\right] \\ &= (e^{\theta})(\tan\theta - \theta) + e^{\theta}(\sec^2\theta - 1) \\ &= e^{\theta}(\tan\theta - \theta + \sec^2\theta - 1) \end{aligned}$$