

Exercise 20Calculate y' .

$$y = e^{x \sec x}$$

SolutionCalculate y' by using the chain and product rules.

$$\begin{aligned} y' &= \frac{d}{dx}(e^{x \sec x}) \\ &= e^{x \sec x} \cdot \frac{d}{dx}(x \sec x) \\ &= e^{x \sec x} \cdot \left\{ \left[\frac{d}{dx}(x) \right] \sec x + x \left[\frac{d}{dx}(\sec x) \right] \right\} \\ &= e^{x \sec x} \cdot [(1) \sec x + x(\sec x \tan x)] \\ &= e^{x \sec x} (\sec x + x \sec x \tan x) \\ &= e^{x \sec x} \sec x (1 + x \tan x) \end{aligned}$$