

Exercise 14

Find the derivative of the function.

$$f(t) = t \sin \pi t$$

Solution

Take the derivative using the product rule and the chain rule.

$$\begin{aligned} f'(t) &= \frac{df}{dt} = \frac{d}{dt}(t \sin \pi t) \\ &= \left[\frac{d}{dt}(t) \right] \sin \pi t + t \left[\frac{d}{dt}(\sin \pi t) \right] \\ &= (1) \sin \pi t + t \left[(\cos \pi t) \cdot \frac{d}{dt}(\pi t) \right] \\ &= \sin \pi t + t [(\cos \pi t) \cdot (\pi)] \\ &= \sin \pi t + \pi t \cos \pi t \end{aligned}$$