

Exercise 1

Differentiate.

$$f(x) = x^2 \sin x$$

Solution

Use the product rule to differentiate $f(x)$.

$$\begin{aligned} f'(x) &= \frac{d}{dx}[f(x)] \\ &= \frac{d}{dx}(x^2 \sin x) \\ &= \left[\frac{d}{dx}(x^2) \right] \sin x + x^2 \left[\frac{d}{dx}(\sin x) \right] \\ &= (2x) \sin x + x^2(\cos x) \\ &= 2x \sin x + x^2 \cos x \end{aligned}$$