

Exercise 43

Calculate y' .

$$y = x \sinh(x^2)$$

Solution

Calculate y' by using the chain and product rules.

$$\begin{aligned} y' &= \frac{d}{dx}[x \sinh(x^2)] \\ &= \left[\frac{d}{dx}(x) \right] \sinh x^2 + x \left[\frac{d}{dx}(\sinh x^2) \right] \\ &= (1) \sinh x^2 + x \left[(\cosh x^2) \cdot \frac{d}{dx}(x^2) \right] \\ &= \sinh x^2 + x [(\cosh x^2) \cdot (2x)] \\ &= \sinh x^2 + 2x^2 \cosh x^2 \end{aligned}$$