

Exercise 2

Differentiate the function.

$$f(x) = x \ln x - x$$

Solution

Take the derivative of the function using the product rule.

$$\begin{aligned} f'(x) &= \frac{d}{dx}(x \ln x - x) \\ &= \frac{d}{dx}(x \ln x) - \frac{d}{dx}(x) \\ &= \left[\frac{d}{dx}(x) \right] \ln x + x \left[\frac{d}{dx}(\ln x) \right] - \frac{d}{dx}(x) \\ &= (1) \ln x + x \left(\frac{1}{x} \right) - (1) \\ &= \ln x + 1 - 1 \\ &= \ln x \end{aligned}$$