

Exercise 11

Differentiate the function.

$$F(t) = (\ln t)^2 \sin t$$

Solution

Take the derivative of the function.

$$\begin{aligned} F'(t) &= \frac{d}{dt}[(\ln t)^2 \sin t] \\ &= \left[\frac{d}{dt}(\ln t)^2 \right] \sin t + (\ln t)^2 \left[\frac{d}{dt}(\sin t) \right] \\ &= \left[2(\ln t) \cdot \frac{d}{dt}(\ln t) \right] \sin t + (\ln t)^2 (\cos t) \\ &= \left[2(\ln t) \cdot \left(\frac{1}{t} \right) \right] \sin t + (\ln t)^2 (\cos t) \\ &= \frac{2 \ln t \sin t}{t} + (\ln t)^2 \cos t \end{aligned}$$