Problem Definition

Problem 11. Find the derivative of the function.

$$f(x) = (x^2 + 1)\ e^{4x}$$

Solution Step 1:

The first step is to apply the product rule to compute the derivative.

$$\begin{aligned} y' &= \frac{d}{dx}(x^2 + 1)\ e^{4x} \\ &= \left(\frac{d}{dx}(x^2 + 1)\right) e^{4x} + (x^2 + 1)\left(\frac{d}{dx}e^{4x}\right) \\ &= (2x)\, e^{4x} + (x^2 + 1)\left(e^{4x}(4)\right) \\ &= 2xe^{4x} + 4(x^2 + 1)e^{4x} \end{aligned}$$

Solution Step 2:

The last step (if necessary) is to simplify the expression with a little algebra.

$$y' = (2x + 4x^2 + 4)e^{4x} = 2(2x^2 + x + 2)e^{4x}$$