

Exercise 7

Find the derivative of the function.

$$F(x) = (5x^6 + 2x^3)^4$$

Solution

Take the derivative using the chain rule.

$$\begin{aligned} F'(x) &= \frac{dF}{dx} = \frac{d}{dx} [(5x^6 + 2x^3)^4] \\ &= 4(5x^6 + 2x^3)^3 \cdot \frac{d}{dx} (5x^6 + 2x^3) \\ &= 4(5x^6 + 2x^3)^3 \cdot (30x^5 + 6x^2) \\ &= 4[x^3(5x^3 + 2)]^3 \cdot 6x^2(5x^3 + 1) \\ &= 24x^{11}(5x^3 + 2)^3(5x^3 + 1) \end{aligned}$$