

Exercise 1

Calculate y' .

$$y = (x^2 + x^3)^4$$

Solution

Calculate y' by using the chain rule.

$$\begin{aligned}y' &= \frac{d}{dx}(x^2 + x^3)^4 \\&= 4(x^2 + x^3)^3 \cdot \frac{d}{dx}(x^2 + x^3) \\&= 4(x^2 + x^3)^3 \cdot (2x + 3x^2) \\&= 4[x^2(1 + x)]^3 \cdot x(2 + 3x) \\&= 4[x^6(1 + x)^3] \cdot x(2 + 3x) \\&= 4x^7(1 + x)^3(2 + 3x)\end{aligned}$$