Exercise 1

Write the composite function in the form $f(g(x))$. [Identify the inner function $u = g(x)$ and the outer function $y = f(u)$.] Then find the derivative dy/dx.

$$y = \sqrt[3]{1 + 4x}$$

Solution

Here $f(x) = \sqrt[3]{x}$ and $g(x) = 1 + 4x$ so that $f(g(x)) = \sqrt[3]{1 + 4x}$. Take the derivative now.

$$y' = \frac{d}{dx}[(1 + 4x)^{1/3}] = \frac{1}{3}(1 + 4x)^{-2/3} \cdot \frac{d}{dx}(1 + 4x) = \frac{1}{3}(1 + 4x)^{-2/3} \cdot 4 = \frac{4}{3(1 + 4x)^{2/3}}$$