

## Exercise 2

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  $dy/dx$ .

$$y = (2x^3 + 5)^4$$

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### Solution

Here  $f(x) = x^4$  and  $g(x) = 2x^3 + 5$  so that  $f(g(x)) = (2x^3 + 5)^4$ . Take the derivative now.

$$y' = \frac{d}{dx}[(2x^3 + 5)^4] = 4(2x^3 + 5)^3 \cdot \frac{d}{dx}(2x^3 + 5) = 4(2x^3 + 5)^3 \cdot (6x^2) = 24x^2(2x^3 + 5)^3$$