

**Exercise 20**

Let  $f(x) = 2x^3 - 4$ . Find a function  $y = g(x)$  so that  $(f \circ g)(x) = x + 2$ .

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**Solution**

The function is

$$g(x) = \sqrt[3]{\frac{1}{2}x + 3}.$$

This can be checked.

$$\begin{aligned} f \circ g &= f(g(x)) \\ &= f\left(\sqrt[3]{\frac{1}{2}x + 3}\right) \\ &= 2\left(\sqrt[3]{\frac{1}{2}x + 3}\right)^3 - 4 \\ &= 2\left(\frac{1}{2}x + 3\right) - 4 \\ &= (x + 6) - 4 \\ &= x + 2 \end{aligned}$$