## Exercise 4

Differentiate.

$$g(x) = \left(x + 2\sqrt{x}\right) e^x$$

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**Solution**

Use the product rule to differentiate $f(x)$.

$$\begin{aligned} f'(x) &= \frac{d}{dx}\left[\left(x + 2\sqrt{x}\right) e^x\right] \\ &= \left[\frac{d}{dx}\left(x + 2\sqrt{x}\right)\right](e^x) + \left(x + 2\sqrt{x}\right)\left[\frac{d}{dx}(e^x)\right] \\ &= \left(1 + 2 \cdot \frac{1}{2}x^{-1/2}\right)(e^x) + \left(x + 2\sqrt{x}\right)(e^x) \\ &= e^x + x^{-1/2}e^x + xe^x + 2x^{1/2}e^x \\ &= (1 + x^{-1/2} + x + 2x^{1/2})e^x \end{aligned}$$