

**Exercise 17**

Differentiate.

$$y = e^p (p + p\sqrt{p})$$

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**Solution**Use the product rule to differentiate  $y$ .

$$\begin{aligned} y' &= \frac{d}{dp} [e^p(p + p^{3/2})] \\ &= \left[ \frac{d}{dp}(e^p) \right] (p + p^{3/2}) + (e^p) \left[ \frac{d}{dp}(p + p^{3/2}) \right] \\ &= (e^p)(p + p^{3/2}) + (e^p) \left( 1 + \frac{3}{2}p^{1/2} \right) \\ &= pe^p + p^{3/2}e^p + e^p + \frac{3}{2}p^{1/2}e^p \\ &= \left( p + p^{3/2} + 1 + \frac{3}{2}p^{1/2} \right) e^p \end{aligned}$$