

**Exercise 24**Calculate  $y'$ .

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

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**Solution**Calculate  $y'$  by using the chain rule.

$$\begin{aligned}y' &= \frac{d}{dx} \left( \frac{1}{\sqrt[3]{x + \sqrt{x}}} \right) \\&= \frac{d}{dx} (x + \sqrt{x})^{-1/3} \\&= \left( -\frac{1}{3} \right) (x + \sqrt{x})^{-4/3} \cdot \frac{d}{dx} (x + \sqrt{x}) \\&= -\frac{1}{3} (x + \sqrt{x})^{-4/3} \cdot \left( 1 + \frac{1}{2} x^{-1/2} \right) \\&= -\frac{1}{3(x + \sqrt{x})^{4/3}} \cdot \left( 1 + \frac{1}{2\sqrt{x}} \right) \\&= -\frac{1}{3\sqrt[3]{(x + \sqrt{x})^4}} \cdot \left( \frac{2\sqrt{x} + 1}{2\sqrt{x}} \right) \\&= -\frac{2\sqrt{x} + 1}{6\sqrt[3]{(x + \sqrt{x})^4}\sqrt{x}}\end{aligned}$$