Exercise 2

Calculate y'.

$$y = \frac{1}{\sqrt{x}} - \frac{1}{\sqrt[5]{x^3}}$$

Solution

Calculate y' by using the power rule.

$$\begin{aligned}
y' &= \frac{d}{dx}\left(\frac{1}{\sqrt{x}} - \frac{1}{\sqrt[5]{x^3}}\right) \\
&= \frac{d}{dx}\left(\frac{1}{\sqrt{x}}\right) - \frac{d}{dx}\left(\frac{1}{\sqrt[5]{x^3}}\right) \\
&= \frac{d}{dx}\left(\frac{1}{x^{1/2}}\right) - \frac{d}{dx}\left(\frac{1}{x^{3/5}}\right) \\
&= \frac{d}{dx}(x^{-1/2}) - \frac{d}{dx}(x^{-3/5}) \\
&= \left(-\frac{1}{2}\right)x^{-1/2-1} - \left(-\frac{3}{5}\right)x^{-3/5-1} \\
&= -\frac{1}{2}x^{-3/2} + \frac{3}{5}x^{-8/5} \\
&= -\frac{1}{2x^{3/2}} + \frac{3}{5x^{8/5}} \\
&= -\frac{1}{2\sqrt{x^3}} + \frac{3}{5\sqrt[5]{x^8}}
\end{aligned}$$