

Exercise 5

Write the composite function in the form $f(g(x))$. [Identify the inner function $u = g(x)$ and the outer function $y = f(u)$.] Then find the derivative dy/dx .

$$y = e^{\sqrt{x}}$$

Solution

Here $f(x) = e^x$ and $g(x) = \sqrt{x}$ so that $f(g(x)) = e^{\sqrt{x}}$. Take the derivative now.

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