

**Exercise 38**Calculate  $y'$ .

$$y = \arctan(\arcsin \sqrt{x})$$

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

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