## Exercise 58

Find the derivative of the function. Simplify where possible.

$$y = \cos^{-1}(\sin^{-1} t)$$

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**Solution**

Use the chain rule and the derivatives of the inverse trigonometric functions listed on page 214.

$$\frac{dy}{dt} = \frac{d}{dt}[\cos^{-1}(\sin^{-1} t)]$$

$$= -\frac{1}{\sqrt{1 - (\sin^{-1} t)^2}} \cdot \frac{d}{dt}(\sin^{-1} t)$$

$$= -\frac{1}{\sqrt{1 - (\sin^{-1} t)^2}} \cdot \left(\frac{1}{\sqrt{1 - t^2}}\right)$$

$$= -\frac{1}{\sqrt{1 - t^2}\sqrt{1 - (\sin^{-1} t)^2}}$$