Exercise 49

Find the derivative of the function. Simplify where possible.

$$y = (\tan^{-1} x)^2$$

Solution

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

$$\begin{aligned}
\frac{dy}{dx} &= \frac{d}{dx}(\tan^{-1} x)^2 \\
&= 2(\tan^{-1} x) \cdot \frac{d}{dx}(\tan^{-1} x) \\
&= 2(\tan^{-1} x) \cdot \left(\frac{1}{1+x^2}\right) \\
&= \frac{2\tan^{-1} x}{1+x^2}
\end{aligned}$$