## Exercise 14

Differentiate the function.

$$P(v) = \frac{\ln v}{1 - v}$$

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**Solution**

Take the derivative of the function.

$$\begin{aligned} P'(v) &= \frac{d}{dv}\left(\frac{\ln v}{1 - v}\right) \\ &= \frac{\left[\frac{d}{dv}(\ln v)\right](1 - v) - \left[\frac{d}{dv}(1 - v)\right]\ln v}{(1 - v)^2} \\ &= \frac{\left(\frac{1}{v}\right)(1 - v) - (-1)\ln v}{(1 - v)^2} \cdot \frac{v}{v} \\ &= \frac{1 - v + v\ln v}{v(1 - v)^2} \end{aligned}$$