

Exercise 37

Use continuity to evaluate the limit.

$$\lim_{x \rightarrow 1} \ln \left(\frac{5 - x^2}{1 + x} \right)$$

Solution

Apply Theorem 8 to bring the limit inside the logarithmic function. This theorem applies because the logarithmic function is continuous at 2, the limit of the inner function as $x \rightarrow 1$.

$$\begin{aligned} \lim_{x \rightarrow 1} \ln \left(\frac{5 - x^2}{1 + x} \right) &= \ln \left(\lim_{x \rightarrow 1} \frac{5 - x^2}{1 + x} \right) \\ &= \ln \left(\frac{5 - 1^2}{1 + 1} \right) \\ &= \ln(2) \end{aligned}$$