Exercise 15

Find the limit.

$$\lim_{x \to \pi^-} \ln(\sin x)$$

Solution

Because x approaches π from the left $(x \to \pi^-)$, $\sin x$ approaches 0 from the right. The natural logarithm of zero from the right is $-\infty$.

$$\lim_{x \to \pi^-} \ln(\sin x) = \ln(\sin \pi^-)$$

$$= \ln(0^+)$$

$$= -\infty$$