

Exercise 20

Find the limit.

$$\lim_{x \rightarrow 1} \left(\frac{1}{x-1} + \frac{1}{x^2 - 3x + 2} \right)$$

Solution

Combine the two functions into one and then evaluate the limit.

$$\begin{aligned} \lim_{x \rightarrow 1} \left(\frac{1}{x-1} + \frac{1}{x^2 - 3x + 2} \right) &= \lim_{x \rightarrow 1} \left[\frac{1}{x-1} + \frac{1}{(x-2)(x-1)} \right] \\ &= \lim_{x \rightarrow 1} \left[\frac{x-2}{(x-2)(x-1)} + \frac{1}{(x-2)(x-1)} \right] \\ &= \lim_{x \rightarrow 1} \frac{(x-2) + 1}{(x-2)(x-1)} \\ &= \lim_{x \rightarrow 1} \frac{x-1}{(x-2)(x-1)} \\ &= \lim_{x \rightarrow 1} \frac{1}{x-2} \\ &= \frac{1}{1-2} \\ &= -1 \end{aligned}$$