

Exercise 28

Evaluate the limit, if it exists.

$$\lim_{x \rightarrow 2} \frac{x^2 - 4x + 4}{x^4 - 3x^2 - 4}$$

Solution

Factor the numerator and denominator, cancel the common factors, and then evaluate the limit.

$$\begin{aligned} \lim_{x \rightarrow 2} \frac{x^2 - 4x + 4}{x^4 - 3x^2 - 4} &= \lim_{x \rightarrow 2} \frac{(x - 2)^2}{(x^2 - 4)(x^2 + 1)} = \lim_{x \rightarrow 2} \frac{(x - 2)^2}{(x + 2)(x - 2)(x^2 + 1)} \\ &= \lim_{x \rightarrow 2} \frac{x - 2}{(x + 2)(x^2 + 1)} \\ &= \frac{0}{(4)(5)} \\ &= 0 \end{aligned}$$