

Exercise 8

Find the limit.

$$\lim_{t \rightarrow 2} \frac{t^2 - 4}{t^3 - 8}$$

Solution

Plugging in 2 right away for t gives 0 in the denominator, so simplify the function first by factoring.

$$\begin{aligned} \lim_{t \rightarrow 2} \frac{t^2 - 4}{t^3 - 8} &= \lim_{t \rightarrow 2} \frac{t^2 - 4}{t^3 - 8} \\ &= \lim_{t \rightarrow 2} \frac{(t + 2)(t - 2)}{(t - 2)(t^2 + 2t + 4)} \\ &= \lim_{t \rightarrow 2} \frac{t + 2}{t^2 + 2t + 4} \\ &= \frac{(2) + 2}{(2)^2 + 2(2) + 4} \\ &= \frac{4}{4 + 4 + 4} \\ &= \frac{1}{3} \end{aligned}$$