

**Exercise 5**

Find the limit.

$$\lim_{x \rightarrow -3} \frac{x^2 - 9}{x^2 + 2x - 3}$$

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**Solution**

Notice that plugging in  $-3$  for  $x$  makes the fraction indeterminate.

$$\begin{aligned} \lim_{x \rightarrow -3} \frac{x^2 - 9}{x^2 + 2x - 3} &= \frac{(-3)^2 - 9}{(-3)^2 + 2(-3) - 3} \\ &= \frac{0}{0} \end{aligned}$$

Try to simplify the function by factoring before plugging in  $-3$ .

$$\begin{aligned} \lim_{x \rightarrow -3} \frac{x^2 - 9}{x^2 + 2x - 3} &= \lim_{x \rightarrow -3} \frac{(x + 3)(x - 3)}{(x + 3)(x - 1)} \\ &= \lim_{x \rightarrow -3} \frac{x - 3}{x - 1} \\ &= \frac{(-3) - 3}{(-3) - 1} \\ &= \frac{-6}{-4} \\ &= \frac{3}{2} \end{aligned}$$