

## Exercise 23

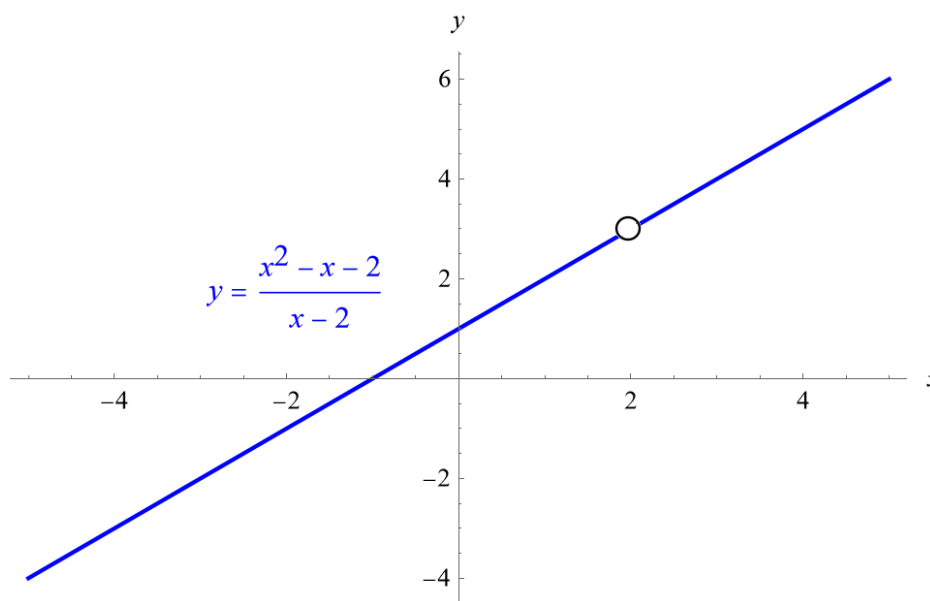
How would you “remove the discontinuity” of  $f$ ? In other words, how would you define  $f(2)$  in order to make  $f$  continuous at 2?

$$f(x) = \frac{x^2 - x - 2}{x - 2}$$

### Solution

Notice that because the factor of  $x - 2$  cancels out in the denominator, a hole (removable discontinuity) is left in the graph at  $x = 2$ .

$$\begin{aligned} f(x) &= \frac{x^2 - x - 2}{x - 2} \\ &= \frac{(x - 2)(x + 1)}{x - 2} \\ &= x + 1 \end{aligned}$$



Remove the discontinuity by defining  $f(2) = 2 + 1 = 3$ .

$$f(x) = \begin{cases} \frac{x^2 - x - 2}{x - 2} & \text{if } x \neq 2 \\ 3 & \text{if } x = 2 \end{cases}$$