

## Exercise 44

Find the inverse function of  $f(x) = \frac{1}{x-1}$ . Use a graphing utility to find its domain and range. Write the domain and range in interval notation.

### Solution

In order to find the inverse function, switch  $x$  with  $y$  in the given equation.

$$x = \frac{1}{y-1}$$

Now solve for  $y$ .

$$x \times (y-1) = \frac{1}{y-1} \times (y-1)$$

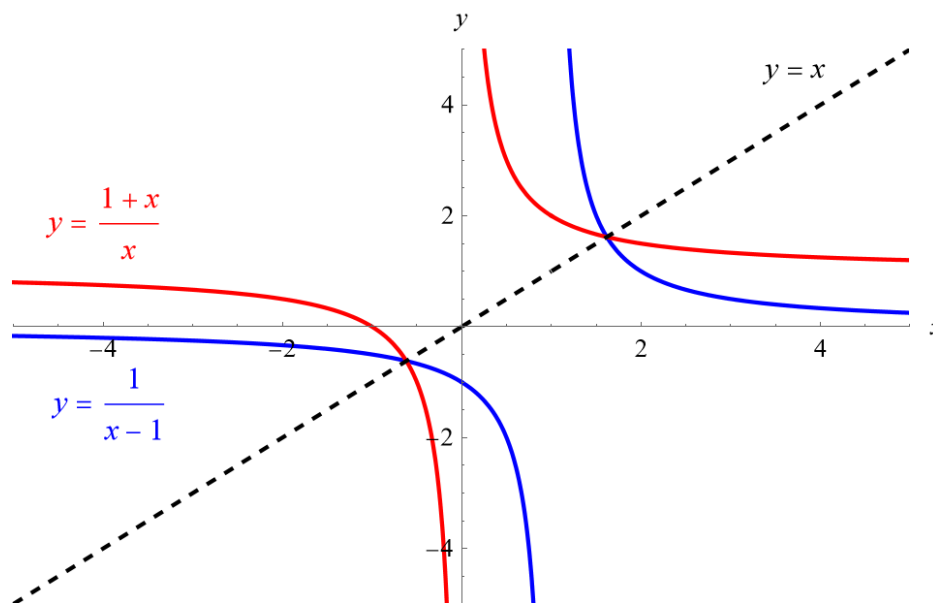
$$xy - x = 1$$

$$xy = 1 + x$$

$$y = \frac{1+x}{x}$$

Therefore, the inverse function is

$$f^{-1}(x) = \frac{1+x}{x}.$$



$$\text{Domain: } (-\infty, 0) \cup (0, \infty)$$

$$\text{Range: } (-\infty, 1) \cup (1, \infty)$$