

## Exercise 4

Are one-to-one functions either always increasing or always decreasing? Why or why not?

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### Solution

Continuous one-to-one functions have to always be increasing or always be decreasing in order to pass the horizontal line test. Discontinuous functions can increase and decrease as shown in the example below.

$$f(x) = \begin{cases} 2x + 1 & \text{if } 0 < x < 1.7 \\ -2x - 1 & \text{if } 1.7 < x < 4 \end{cases}$$

