

## Exercise 2

Suppose  $f$  is a continuous function defined on a closed interval  $[a, b]$ .

- (a) What theorem guarantees the existence of an absolute maximum value and an absolute minimum value for  $f$ ?
  - (b) What steps would you take to find those maximum and minimum values?
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### Solution

- (a) The Extreme Value Theorem guarantees the existence of an absolute maximum value and an absolute minimum value for  $f$  over  $[a, b]$ .
- (b) (1) Find the critical numbers of  $f$  by solving  $f'(x) = 0$  for  $x$ , (2) evaluate the function at these critical numbers, (3) evaluate the function at the endpoints, and (4) compare the results. The largest of the values from steps (2) and (3) is the absolute maximum, and the smallest of the values from steps (2) and (3) is the absolute minimum.