Exercise 30

For the following exercises, use the vertical line test to determine whether each of the given graphs represents a function. **Assume that a graph continues at both ends if it extends beyond the given grid.** If the graph represents a function, then determine the following for each graph:

a. Domain and range

b. x-intercept, if any (estimate where necessary)

c. y-intercept, if any (estimate where necessary)

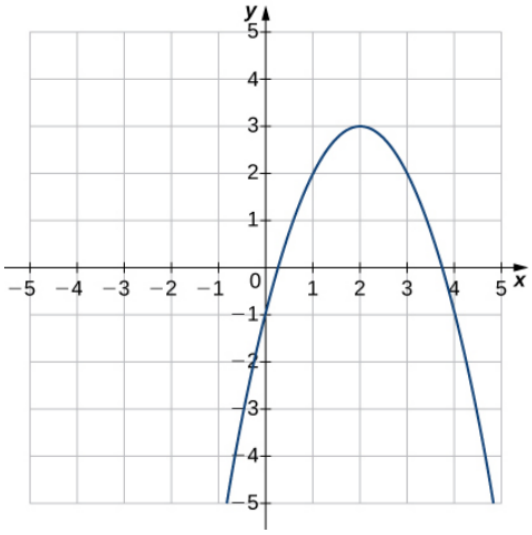
d. The intervals for which the function is increasing

e. The intervals for which the function is decreasing

f. The intervals for which the function is constant

g. Symmetry about any axis and/or the origin

h. Whether the function is even, odd, or neither



Solution

The given graph does represent a function because it passes the vertical line test.

$$\text{Domain:} \quad \{x \mid -\infty < x < \infty\}$$

$$\text{Range:} \quad \{y \mid -\infty < y \leq 3\}$$

The x-intercepts are points where the function touches the x-axis.

$$x\text{-intercepts:} \quad (0.25, 0),\ (3.75, 0)$$

The y-intercepts are points where the function touches the y-axis.

$$y\text{-intercepts:} \quad (0, -1)$$

The function is increasing for $-\infty < x < 2$, and the function is decreasing for $2 < x < \infty$. There is no symmetry about either axis or the origin, so the function is neither even nor odd.