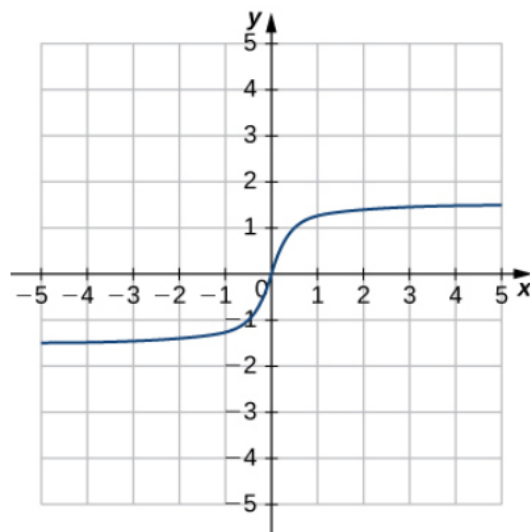


Exercise 31

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:

- Domain and range
- x -intercept, if any (estimate where necessary)
- y -intercept, if any (estimate where necessary)
- The intervals for which the function is increasing
- The intervals for which the function is decreasing
- The intervals for which the function is constant
- Symmetry about any axis and/or the origin
- Whether the function is even, odd, or neither



Solution

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

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

$$\text{Range: } \{y \mid -1.5 < y < 1.5\}$$

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

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

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

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

The function is increasing for $-\infty < x < \infty$, and the function is decreasing nowhere. There is symmetry about the origin, so the function is odd.