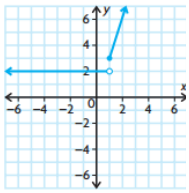
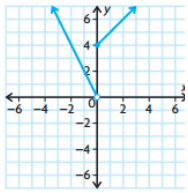
ANSWERS PIECEWISE FUNCTIONS

Lesson 1.6, pp. 51–53

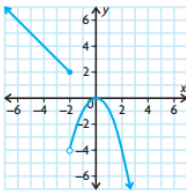
1. **a)**



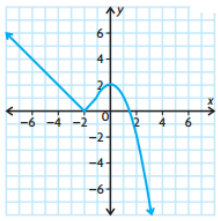
b)



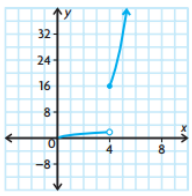
c)



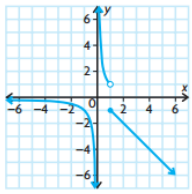
d)



e)



f)



2. **a)** Discontinuous at $x = 1$
b) Discontinuous at $x = 0$
c) Discontinuous at $x = -2$
d) Continuous
e) Discontinuous at $x = 4$
f) Discontinuous at $x = 1$ and

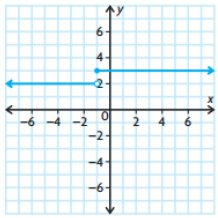
3. **a)** $f(x) = \begin{cases} x^2 - 2, \text{ if } x \le 1 \\ x + 1, \text{ if } x > 1 \end{cases}$

b) $f(x) = \begin{cases} |x|, \text{ if } x < 1 \\ \sqrt{x}, \text{ if } x \ge 1 \end{cases}$

4. **a)** $D = \{x \in \mathbf{R}\}$; the function is discontinuous at $x = 1$.

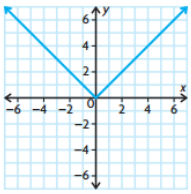
b) $D = \{x \in \mathbf{R}\}$; the function is continuous.

5. **a)**



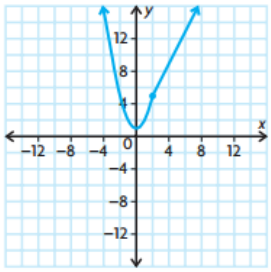
The function is discontinuous at $x = -1$.
$D = \{x \in \mathbf{R}\}$
$R = \{2, 3\}$

b)



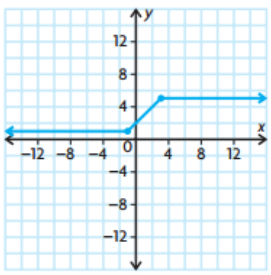
The function is continuous.
$D = \{x \in \mathbf{R}\}$
$R = \{f(x) \in \mathbf{R} \mid f(x) \ge 0\}$

5. **c)**



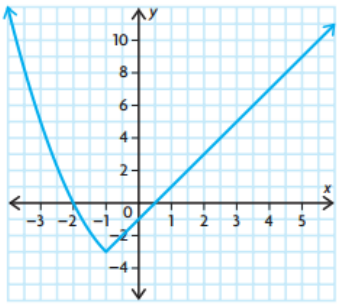
The function is continuous.
$D = \{x \in \mathbf{R}\}$
$R = \{f(x) \in \mathbf{R} \mid f(x) \ge 1\}$

d)

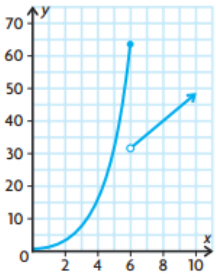


The function is continuous.
$D = \{x \in \mathbf{R}\}$
$R = \{f(x) \in \mathbf{R} \mid 1 \le f(x) \le$

8. $k = 4$



9. **a)**



b) The function is discontinuous at $x = 6$.
c) 32 000 fish
d) 8 years after the spill
e) Answers may vary. For example, three possible events are environmental changes, introduction of a new predator, and increased fishing.

14. To make the first two pieces continuous, $5(-1) = -1 + k$, so $k = -4$. But if $k = -4$, the graph is discontinuous at $x = 3$.