In exercises requiring estimations or approximations, your answers may vary slightly from the answers given here.

2. (a) The point \((-4, -2)\) is on the graph of \(f\), so \(f(-4) = -2\). The point \((3, 4)\) is on the graph of \(g\), so \(g(3) = 4\).
(b) We are looking for the values of \(x\) for which the \(y\)-values are equal. The \(y\)-values for \(f\) and \(g\) are equal at the points \((-2, 1)\) and \((2, 2)\), so the desired values of \(x\) are \(-2\) and \(2\).
(c) \(f(x) = -1\) is equivalent to \(y = -1\). When \(y = -1\), we have \(x = -3\) and \(x = 4\).
(d) As \(x\) increases from \(0\) to \(4\), \(y\) decreases from \(3\) to \(-1\). Thus, \(f\) is decreasing on the interval \([0, 4]\).
(e) The domain of \(f\) consists of all \(x\)-values on the graph of \(f\). For this function, the domain is \(-4 \leq x \leq 4\), or \([-4, 4]\). The range of \(f\) consists of all \(y\)-values on the graph of \(f\). For this function, the range is \(-2 \leq y \leq 3\), or \([-2, 3]\).
(f) The domain of \(g\) is \([-4, 3]\) and the range is \([0.5, 4]\).

11. The water will cool down almost to freezing as the ice melts. Then, when the ice has melted, the water will slowly warm up to room temperature.

\[\text{Graph of a function} \]

19. (a) From the graph, we estimate the number of cell-phone subscribers worldwide to be about 92 million in 1995 and 485 million in 1999.
(b) From the graph, we estimate the number of cell-phone subscribers worldwide to be about 92 million in 1995 and 485 million in 1999.

28. \(f(x) = \frac{5x + 4}{x^2 + 3x + 2}\) is defined for all \(x\) except when \(0 = x^2 + 3x + 2 \iff 0 = (x + 2)(x + 1) \iff x = -2\) or \(-1\), so the domain is \(\{x \in \mathbb{R} \mid x \neq -2, -1\} = (-\infty, -2) \cup (-2, -1) \cup (-1, \infty)\).
41. \( f(x) = \begin{cases} x + 2 & \text{if } x < 0 \\ 1 - x & \text{if } x \geq 0 \end{cases} \)

The domain is \( \mathbb{R} \).

56. The area of the window is \( A = xh + \frac{1}{2} \pi \left( \frac{1}{2} x \right)^2 = xh + \frac{\pi x^2}{8} \), where \( h \) is the height of the rectangular portion of the window.

The perimeter is \( P = 2h + x + \frac{1}{2} \pi x = 30 \) \( \Rightarrow \) \( 2h = 30 - x - \frac{1}{2} \pi x \) \( \Rightarrow \) \( h = \frac{1}{4} (60 - 2x - \pi x) \). Thus,

\[
A(x) = x \left( \frac{60 - 2x - \pi x}{4} + \frac{\pi x^2}{8} \right) = 15x - \frac{1}{2} \pi x^2 + \frac{\pi}{8} x^2 = 15x - \frac{4}{8} x^2 - \frac{\pi}{8} x^2 = 15x - x^2 \left( \frac{\pi + 4}{8} \right).
\]

Since the lengths \( x \) and \( h \) must be positive quantities, we have \( x > 0 \) and \( h > 0 \). For \( h > 0 \), we have \( 2h > 0 \) \( \Leftrightarrow \) \( 30 - x - \frac{1}{2} \pi x > 0 \) \( \Leftrightarrow \) \( 60 > 2x + \pi x \) \( \Leftrightarrow \) \( x < \frac{60}{2 + \pi} \). Hence, the domain of \( A \) is \( 0 < x < \frac{60}{2 + \pi} \).

62. \( f \) is not an even function since it is not symmetric with respect to the \( y \)-axis. \( f \) is not an odd function since it is not symmetric about the origin. Hence, \( f \) is neither even nor odd. \( g \) is an even function because its graph is symmetric with respect to the \( y \)-axis.

65. \( f(x) = \frac{x}{x^2 + 1} \).

\[
f(-x) = \frac{-x}{(-x)^2 + 1} = \frac{-x}{x^2 + 1} = -\frac{x}{x^2 + 1} = -f(x).
\]

So \( f \) is an odd function.
66. \[ f(x) = \frac{x^2}{x^4 + 1}. \]

\[ f(-x) = \frac{(-x)^2}{(-x)^4 + 1} = \frac{x^2}{x^4 + 1} = f(x). \]

So \( f \) is an even function.