

H **1.6** **Reteach**

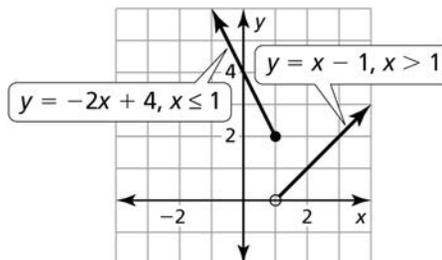
EXAMPLE Graphing a Piecewise Function

Graph $y = \begin{cases} -2x + 4, & \text{if } x \leq 1 \\ x - 1, & \text{if } x > 1 \end{cases}$. Describe the domain, range, and end behavior of the function.

SOLUTION

Step 1 Graph $y = -2x + 4$ for $x \leq 1$. Because 1 is included in the domain for this equation, use a closed circle at (1, 2).

Step 2 Graph $y = x - 1$ for $x > 1$. Because 1 is not included in the domain for this equation, use an open circle at (1, 0).



► The domain is all real numbers. The range is $y > 0$. The graph shows that $y \rightarrow +\infty$ as $x \rightarrow -\infty$ and $y \rightarrow +\infty$ as $x \rightarrow +\infty$.

EXAMPLE Writing a Piecewise Function

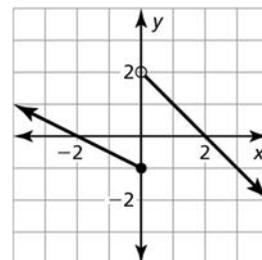
Write a piecewise function represented by the graph.

SOLUTION

Left Piece When $x \leq 0$, the graph is the line represented by $y = -\frac{1}{2}x - 1$.

Right Piece When $x > 0$, the graph is the line represented by $y = -x + 2$.

► So, a piecewise function is $f(x) = \begin{cases} -\frac{1}{2}x - 1, & \text{if } x \leq 0 \\ -x + 2, & \text{if } x > 0 \end{cases}$.



In Exercises 1 and 2, evaluate the function when $x = -4, -2, -1, \frac{1}{2}$, and 2.

1. $f(x) = \begin{cases} 2x + 3, & \text{if } x < 0 \\ x - 5, & \text{if } x \geq 0 \end{cases}$

2. $f(x) = \begin{cases} -3x - 2, & \text{if } x \leq -2 \\ 4x + 1, & \text{if } x > -2 \end{cases}$

In Exercises 3 and 4, graph the function. Describe the domain, range, and end behavior of the function.

3. $f(x) = \begin{cases} -x, & \text{if } x < 3 \\ x + 4, & \text{if } x \geq 3 \end{cases}$

4. $f(x) = \begin{cases} -3x, & \text{if } x \leq -1 \\ 3x, & \text{if } x > -1 \end{cases}$

In Exercises 5 and 6, write a piecewise function for the graph.

