EXAMPLE 2 Graph $y = \frac{1}{x} + k$

Graph $y = \frac{1}{x} + 3$ and identify its domain and range. Compare the graph with the graph of $y = \frac{1}{x}$.

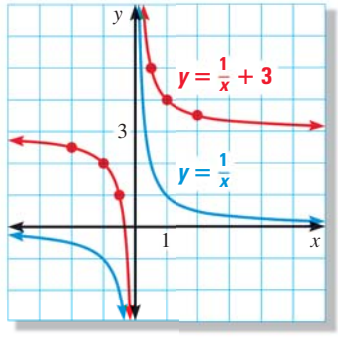
Solution

Graph the function using a table of values.

The domain is all real numbers except 0. The range is all real numbers except 3.

The graph of $y = \frac{1}{x} + 3$ is a vertical translation (of 3 units up) of the graph of $y = \frac{1}{x}$.

x	y
−2	2.5
−1	2
−0.5	1
0	undefined
0.5	5
1	4
2	3.5



EXAMPLE 3 Graph $y = \frac{1}{x - h}$

Graph $y = \frac{1}{x - 2}$ and identify its domain and range. Compare the graph with the graph of $y = \frac{1}{x}$.

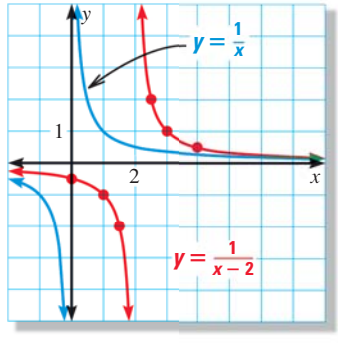
Solution

Graph the function using a table of values.

The domain is all real numbers except 2. The range is all real numbers except 0.

The graph of $y = \frac{1}{x - 2}$ is a horizontal translation (of 2 units to the right) of the graph of $y = \frac{1}{x}$.

x	y
0	−0.5
1	−1
1.5	−2
2	undefined
2.5	2
3	1
4	0.5



GUIDED PRACTICE for Examples 1, 2, and 3

Graph the function and identify its domain and range. *Compare* the graph with the graph of $y = \frac{1}{x}$.

1. $y = \frac{-4}{x}$
2. $y = \frac{1}{x} - 4$
3. $y = \frac{1}{x + 5}$
4. *Describe* how the graph of $y = \frac{1}{x + 3}$ is related to the graph of $y = \frac{1}{x}$.