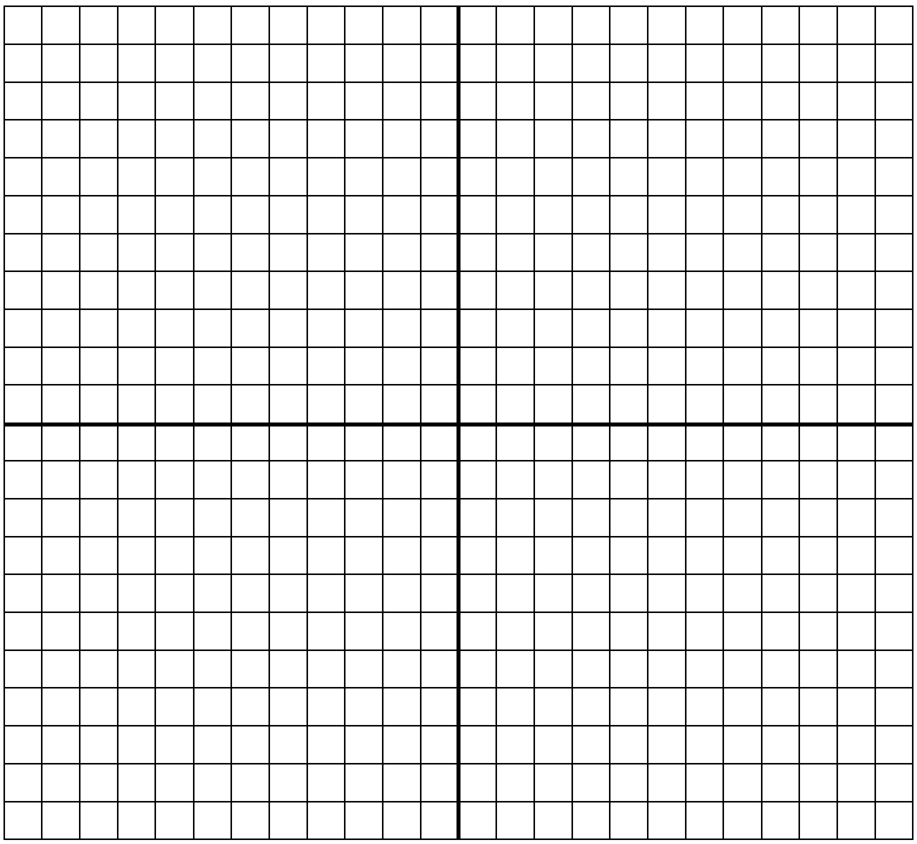
Exploring a Reciprocal Function

1. Complete the table of values for $y = \frac{1}{x}$. Round answers to 2 places if necessary.

Graph the points accurately on the grid provided (four points in the table won't fit).

Use increments of 0.1 on the *x*-axis and 1 on the *y*-axis.



x	y
-100	
-10	
-1	
-0.9	
-0.8	
-0.7	
-0.6	
-0.5	
-0.4	
-0.3	
-0.2	
-0.1	
0	
0.1	
0.2	
0.3	
0.4	
0.5	
0.6	
0.7	
0.8	
0.9	
1	
10	
100	

2. Use your calculator to graph $y = \frac{1}{x}$ using the same window as above.

Check the values in the table. You may need to change your TBLSET.

3. For which x value is the function not defined? At this value, draw a **vertical asymptote** using a dotted line. This is a line that is not actually part of the graph, but displays where the function is not defined. Values of the function approach the vertical asymptote from either side.

4. For which y value is the function not defined? At this value, draw a **horizontal asymptote**. The values of the function will approach this asymptote on the ends. It is possible (though not for this graph) for a function to cross a horizontal asymptote.

5. There are two points on the graph that have the same co-ordinates as $y = x$. This is significant since $y = \frac{1}{x}$ is the reciprocal of $y = x$. These points are called **invariant** points. Write the co-ordinates of the two invariant points.

6. Complete the following based on the graph of $y = \frac{1}{x}$:

Domain: ________________

Range: ________________

x-int(s): ________________

y-int(s): ________________

7. State the value that the function approaches (the y value) as x approaches the following values:

As $x \to \infty$, the function approaches _________.

As $x \to -\infty$, the function approaches _________.

As $x \to 0$ from the left (negative side), the function approaches _________.

As $x \to 0$ from the right (positive side), the function approaches _________.