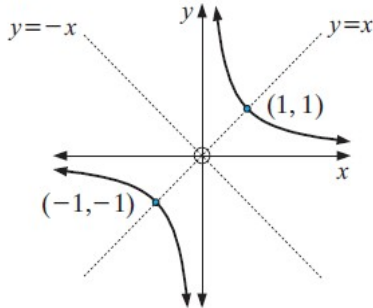


# Focus on Reciprocal Functions

$x \mapsto \frac{1}{x}$ , i.e.,  $f(x) = \frac{1}{x}$  is defined as the **reciprocal function**.

It has graph:



- $f(x) = \frac{1}{x}$  is **asymptotic** to the  $x$ -axis and to the  $y$ -axis.

[The graph gets closer to the axes as it gets further from the origin.]

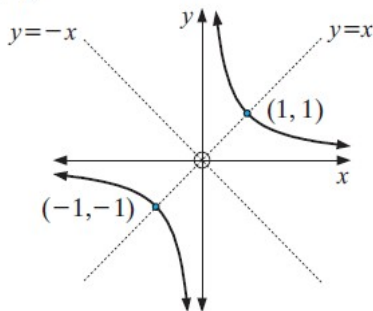
Notice that:

- $f(x) = \frac{1}{x}$  is meaningless when  $x = 0$
- The graph of  $f(x) = \frac{1}{x}$  exists in the first and third quadrants only.
- $f(x) = \frac{1}{x}$  is symmetric about  $y = x$  and  $y = -x$
- as  $x \rightarrow \infty$ ,  $f(x) \rightarrow 0$  (from above)  
as  $x \rightarrow -\infty$ ,  $f(x) \rightarrow 0$  (from below)  
as  $x \rightarrow 0$  (from right),  $y \rightarrow \infty$   
as  $x \rightarrow 0$  (from left),  $y \rightarrow -\infty$   
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