

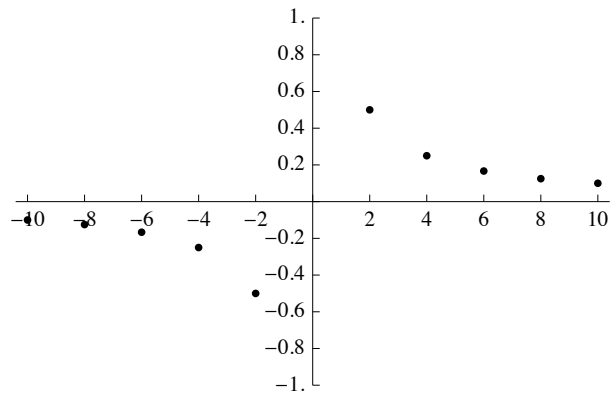
Graphs Involving Division by Zero

Let's try to graph the following function:

$$f(x) = \frac{1}{x}$$

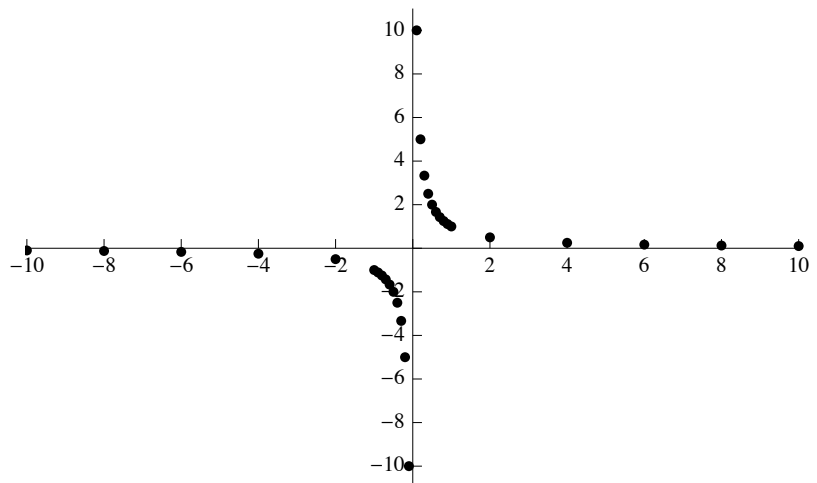
When graphing a function that you are not familiar with, the best way to get started is to create an In-Out table. When you first learned how to graph equations, you were probably told to choose a set of In values (also known as x values) that included negative numbers, positive numbers, and zero. Let's follow that advice to create an In-Out table and graph the points:

In, x	Out, $f(x) = 1/x$
-10	-0.1000
-8	-0.1250
-6	-0.1667
-4	-0.2500
-2	-0.5000
0	Undefined
2	0.5000
4	0.2500
6	0.1667
8	0.1250
10	0.1000

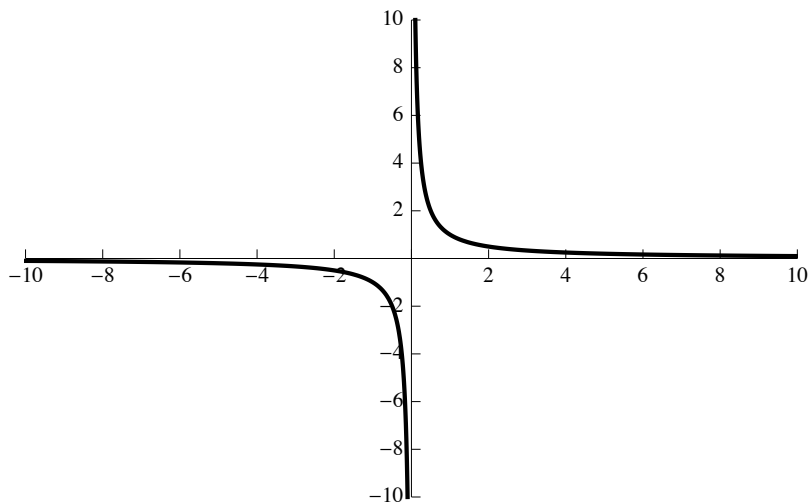


A pattern in the graph is beginning to emerge, but it looks like we need to plot more points closer to $x = 0$. If we generate more points and graph them, this is what we get:

In, x	Out, $f(x) = 1/x$
-1.	-1.
-0.9	-1.11111
-0.8	-1.25
-0.7	-1.42857
-0.6	-1.66667
-0.5	-2.
-0.4	-2.5
-0.3	-3.33333
-0.2	-5.
-0.1	-10.
0	Undefined
0.1	10.
0.2	5.
0.3	3.33333
0.4	2.5
0.5	2.
0.6	1.66667
0.7	1.42857
0.8	1.25
0.9	1.11111
1.	1.



If we draw the curve, rather than plot points, we get:



Notice that as the positive x values get smaller and smaller (closer and closer to zero), the y values get larger and larger (closer to $+\infty$). Also note that as the positive x values get larger and larger, the y values get closer and closer to zero.

Also notice that as the negative x values get closer and closer to zero, the y values get smaller and smaller (closer to $-\infty$). Also note that as the negative x values get smaller and smaller, the y values get closer and closer to zero.