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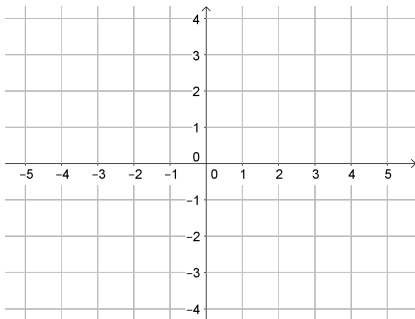# Graphing Rational Functions - $f(x) = \frac{1}{x}$

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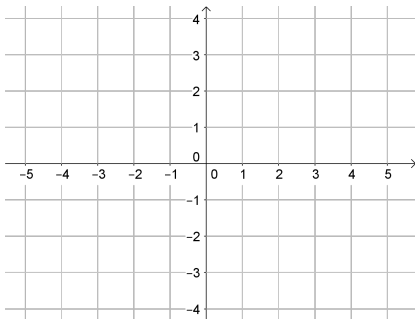# Graphing Rational Functions - $f(x) = \frac{1}{x}$

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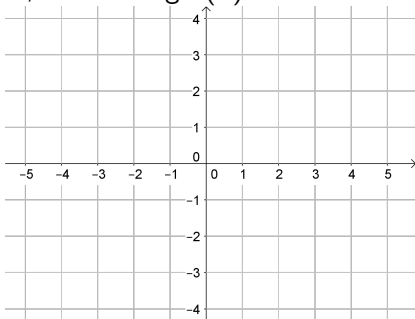$$f(x) = \frac{P(x)}{D(x)}$$

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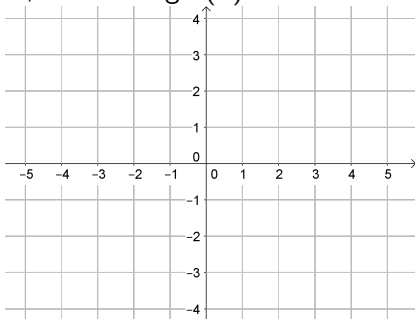We saw that these functions are undefined for x so $D(x) = 0$

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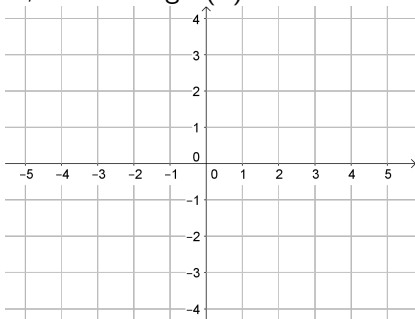We saw that these functions are undefined for x so $D(x) = 0$

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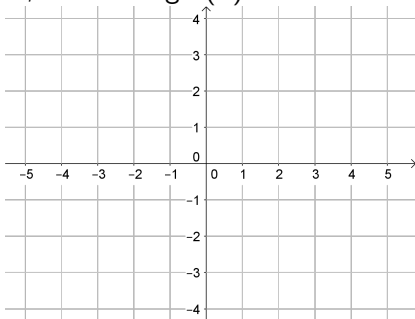
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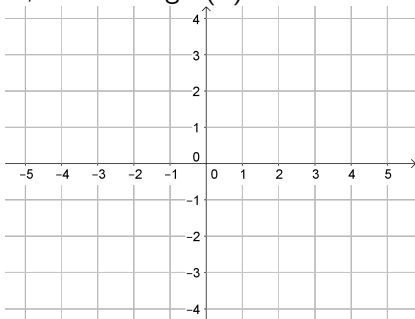
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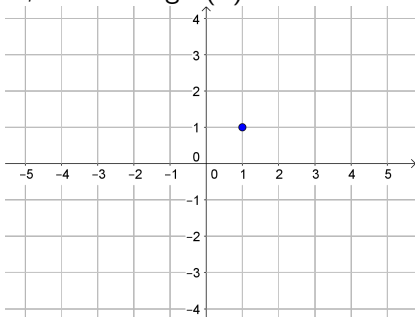
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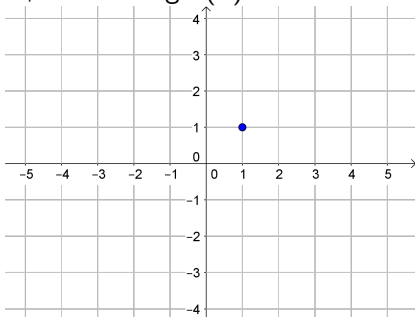
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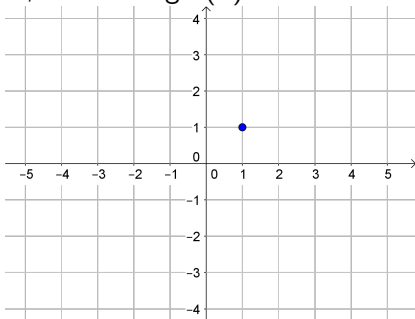Now we will graph our easiest Rational Function:
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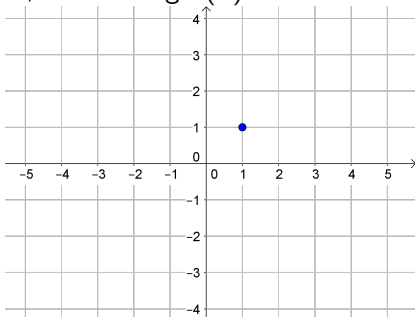Now we will graph our easiest Rational Function:
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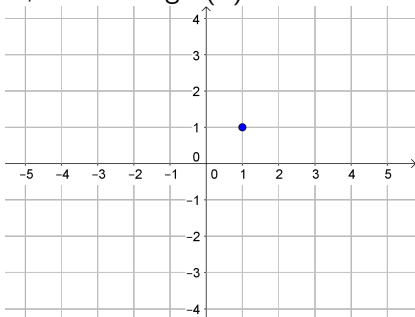
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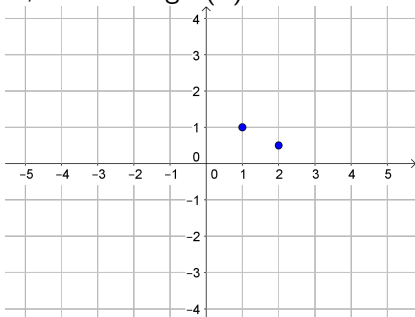Now we will graph our easiest Rational Function:
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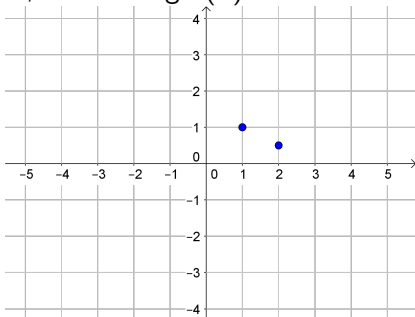Now we will graph our easiest Rational Function:
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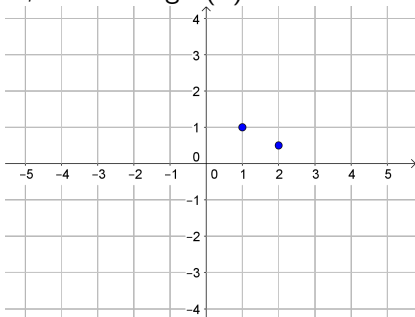$$f(x) = \frac{1}{x}$$

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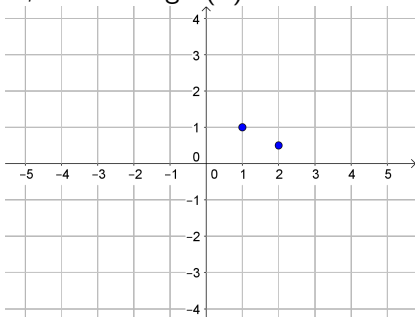$$f(x) = \frac{1}{x}$$

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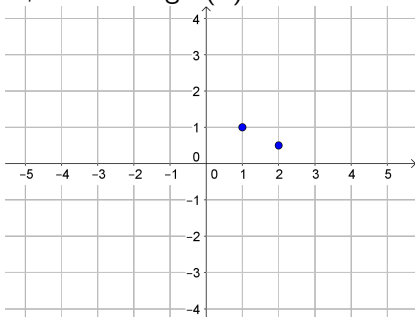$$f(x) = \frac{1}{x}$$

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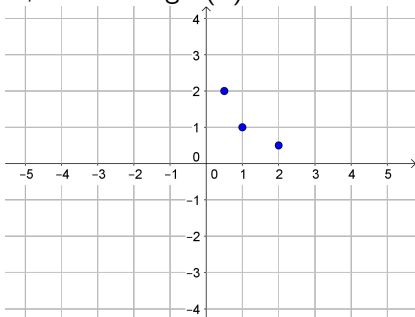$$f(x) = \frac{1}{x}$$

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If $x = \frac{1}{4}$

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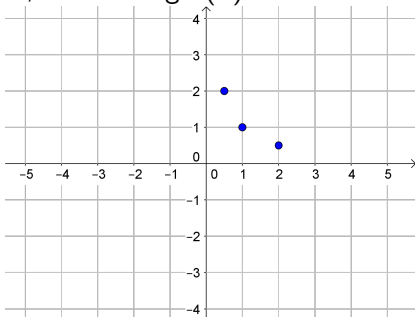To see the whole graph, let's start with some points.

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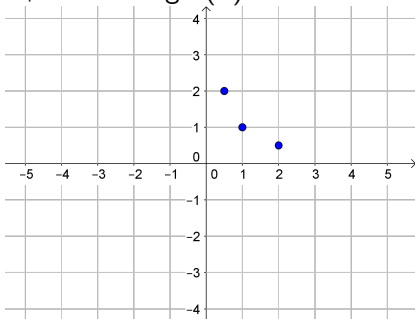To see the whole graph, let's start with some points.

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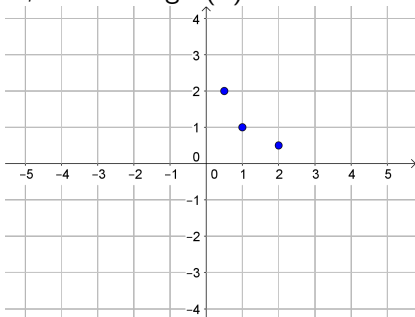To see the whole graph, let's start with some points.

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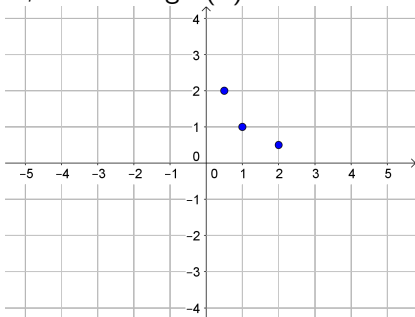To see the whole graph, let's start with some points.

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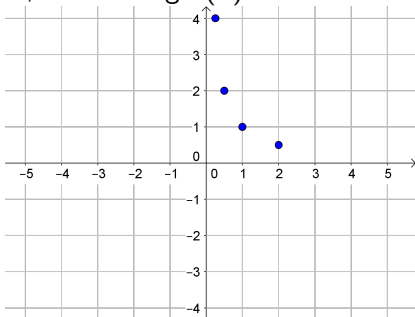
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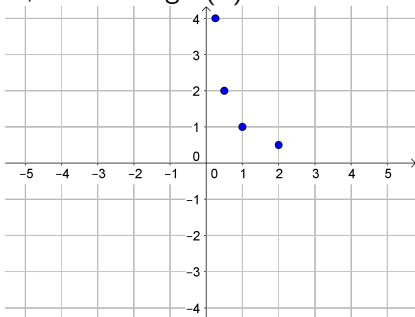We can find points by picking $x-$values, and finding $f(x)$

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If $x \to 0$ then $f(x) = \frac{1}{x}$ gets bigger

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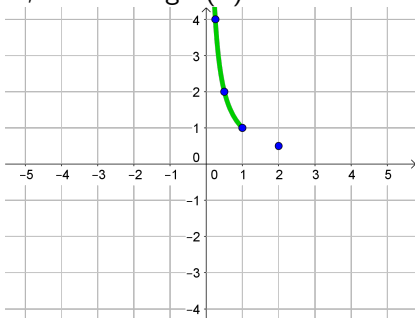We can find points by picking $x-$values, and finding $f(x)$

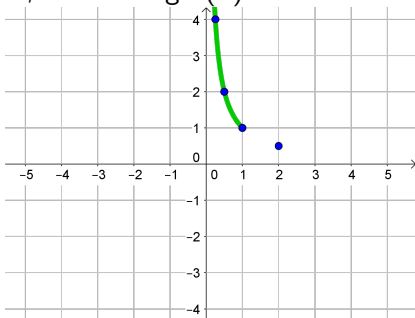If $x = 1 \rightarrow f(1) = \frac{1}{1} = 1 \rightarrow (1, 1)$

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Now we will graph our easiest Rational Function:

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To see the whole graph, let's start with some points.

We can find points by picking $x-$values, and finding $f(x)$

If $x = 1 \rightarrow f(1) = \frac{1}{1} = 1 \rightarrow (1, 1)$

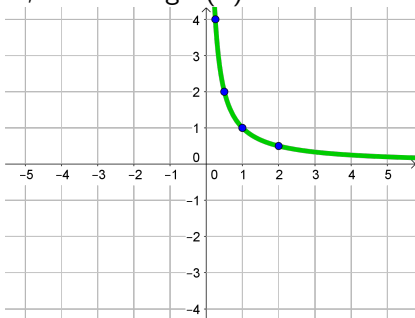If $x = 2 \rightarrow f(2) = \frac{1}{2} = \frac{1}{2} \rightarrow \left(2, \frac{1}{2}\right)$

If $x = \frac{1}{2} \rightarrow f(\frac{1}{2}) = \frac{1}{\frac{1}{2}} = 2 \rightarrow \left(\frac{1}{2}, 2\right)$

If $x = \frac{1}{4} \rightarrow f(\frac{1}{4}) = \frac{1}{\frac{1}{4}} = 4 \rightarrow \left(\frac{1}{4}, 4\right)$

If $x \rightarrow 0$ then $f(x) = \frac{1}{x}$ gets bigger

If $x \rightarrow \infty$ then $f(x) = \frac{1}{x}$ gets smaller

Graphing Rational Functions - $f(x) = \frac{1}{x}$

$\boxed{\text{▸ We defined}}$ a Rational Function as:
$$f(x) = \frac{P(x)}{D(x)}$$

We saw that these functions are undefined for x so $D(x) = 0$

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If $x = \frac{1}{2} \to f(\frac{1}{2}) = \frac{1}{\frac{1}{2}} = 2 \to \left(\frac{1}{2}, 2\right)$

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If $x \to 0$ then $f(x) = \frac{1}{x}$ gets bigger

If $x \to \infty$ then $f(x) = \frac{1}{x}$ gets smaller

For $x < 0$ we get a similar picture, but with $f(x) = \frac{1}{x} < 0$ as well

Graphing Rational Functions - $f(x) = \frac{1}{x}$

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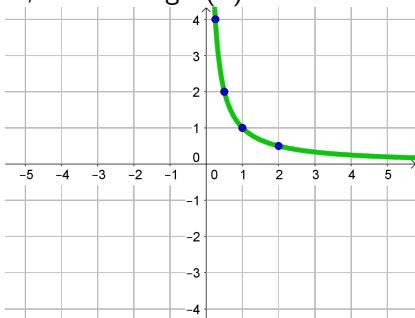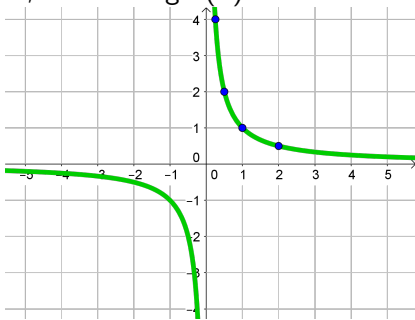If $x = 1 \rightarrow f(1) = \frac{1}{1} = 1 \rightarrow (1, 1)$

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