Base Function: Graph of Base Function:

Key Points:

x	y
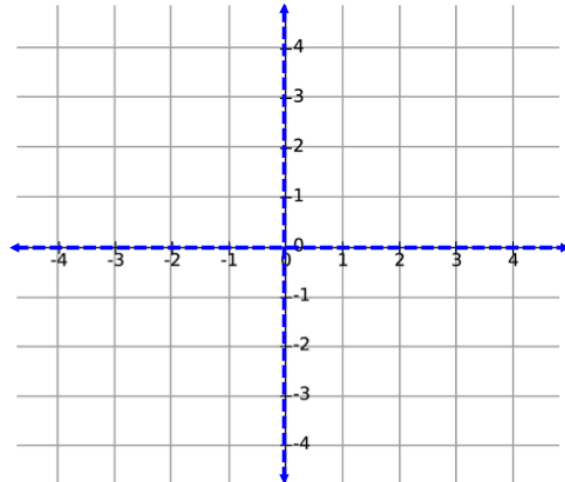
Asymptotes

Asymptote:

The function $f(x) = \frac{1}{x}$ has two asymptotes:

Vertical Asymptote: Division by zero is undefined. Therefore the expression in the denominator of the function can not be zero. Therefore $x \neq 0$. This is why the vertical line $x = 0$ is an asymptote for this function.

Horizontal Asymptote: For the range, there can never be a situation where the result of the division is zero. Therefore the line $y = 0$ is a horizontal asymptote. For all functions where the denominator is a higher degree than the numerator, there will by a horizontal asymptote at $y = 0$.

Example 1: Describe the combination of transformations that must be applied to the base function $f(x) = \frac{1}{x}$ to obtain the transformed function. Then, write the corresponding equations.

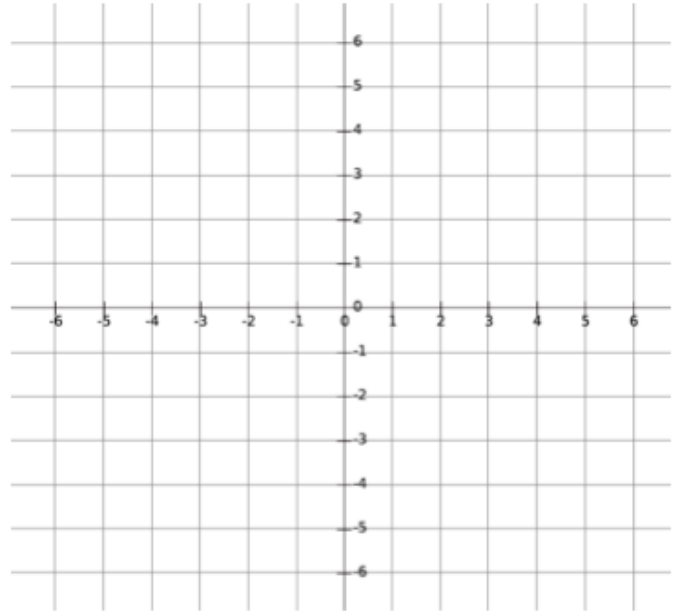**a)** $g(x) = 4f(x - 3) + 0.5$ **b)** $g(x) = f[-2(x + 0.5)] - 1$

Example 2: for each of the following functions…

    i) make a table of values for the parent function $f(x) = \frac{1}{x}$
    ii) describe the transformations
    iii) make a table of values of image points
    iv) graph the transformed function and write it's equation

a) $g(x) = 2f(x-1) + 2$

x	y

b) $g(x) = -f[2(x+0.5)] - 1$

x	y