

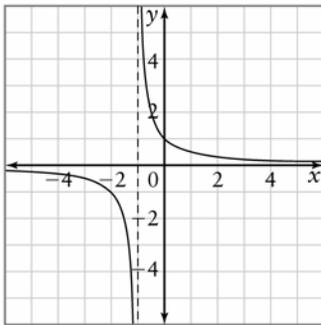
3.1 Reciprocal of a Linear Function

1. Copy and complete the table to describe the behaviour of the function

$$f(x) = \frac{1}{x-4}$$

As $x \rightarrow$	$f(x) \rightarrow$
4^+	
4^-	
$+\infty$	
$-\infty$	

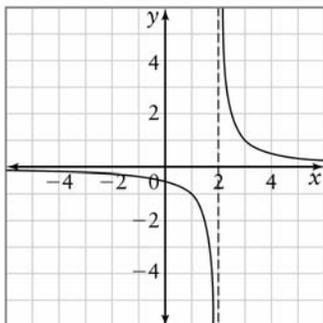
2. Write equations to represent the horizontal and vertical asymptotes of the rational function. Then, write a possible equation for the function.



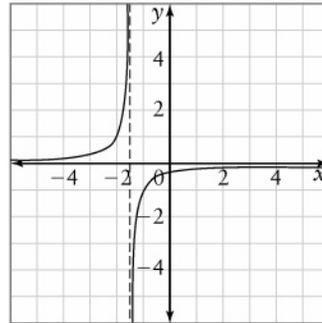
3. For the function $f(x) = \frac{2}{4-x}$,
- write equations to represent the vertical and horizontal asymptotes
 - determine the y -intercept

4. Determine a possible equation to represent each function shown.

a)



b)



5. Sketch each function and then describe the intervals where the slope is increasing and the intervals where it is decreasing.

a) $f(x) = -\frac{1}{x+3}$

b) $h(x) = \frac{2}{2x-3}$

6. Sketch a graph of each function. Label the y -intercept. State the domain, the range, the equations of asymptotes, and the intervals over which the slope is increasing and decreasing.

a) $f(x) = -\frac{1}{x-5}$

b) $h(x) = \frac{2}{5-2x}$

7. The pressure inside a cylinder is inversely proportional to the volume of the gas inside it. When the volume of gas is 50 cm^3 , the pressure is 400 kPa .

- Write a function to represent the pressure as a function of the volume.
- Sketch a graph of this function.
- Calculate the pressure for a volume of 75 cm^3 .
- As the volume increases, what happens to the rate of change of pressure?

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8. Investigate a variety of functions of the

form $f(x) = \frac{b}{x+2}$, where $b > 0$.

- a)** What is the effect on the graph as the value of b is varied?
b) Use the results from your investigation to sketch a graph of each function.

i) $f(x) = \frac{1}{x+2}$

ii) $f(x) = \frac{3}{x+2}$

iii) $f(x) = \frac{5}{x+2}$

9. Analyse the key features (domain, range, vertical asymptotes, and horizontal

asymptotes) of $f(x) = \frac{1}{\sin x}$, and then

sketch the function.