

# Assignment

## Write

Describe why a rational function never crosses its vertical asymptote.

## Remember

A rational function is any function that can be written as the ratio of two polynomials. It can be written in the form  $f(x) = \frac{P(x)}{Q(x)}$  where  $P(x)$  and  $Q(x)$  are polynomial functions and  $Q(x) \neq 0$ .

## Practice

1. Consider the function  $f(x) = \frac{4}{x}$ .

a. Complete the table.

<b>x</b>	-8	-4	-2	-1	$-\frac{1}{2}$	0	$\frac{1}{2}$	1	2	4	8
<b>f(x)</b>											

b. Use the table to graph the function.

c. Analyze the function and the corresponding table and graph. Describe the domain, range, and end behavior of the function. Determine all of the asymptotes of the function. Explain your reasoning.

2. Consider the function  $h(x) = \frac{8}{x^2}$ .

a. Complete the table.

<b>x</b>	-8	-4	-2	-1	$-\frac{1}{2}$	0	$\frac{1}{2}$	1	2	4	8
<b>h(x)</b>											

b. Use the table to graph the function.

c. Analyze the function and the corresponding table and graph. Describe the domain, range, and end behavior of the function. Determine all of the asymptotes of the function. Explain your reasoning.

## Stretch

1. Consider the function  $f(x) = \frac{2}{x-2}$ .

a. Complete the table.

$x$	-2	0	$\frac{1}{2}$	1	$\frac{3}{2}$	2	$\frac{5}{2}$	3	$\frac{7}{2}$	4	6
$f(x)$											

b. Use the table to graph the function.

c. Analyze the function and the corresponding table and graph. Describe the domain, range, and end behavior of the function. Determine all of the asymptotes of the function. Explain your reasoning.

## Review

1. The table shows the amount of money road repairs have cost (in thousands of dollars) during a six-year period. Use technology to determine a quartic regression equation for the data. Sketch the data and the regression equation on the coordinate plane with the scatter plot. How well does the regression equation model the given data? Explain your reasoning.

2. Use polynomial identities and number properties to calculate  $54^3$ .

3. Identify the extrema, zeros, and intercepts of the graph of the polynomial function  $p(x)$ .

Year	Repair Costs (thousands of \$)
2005	60
2006	70
2007	59
2008	40
2009	50
2010	39
2011	35

