

**LESSON 7.2** Assignment

Name \_\_\_\_\_ Date \_\_\_\_\_

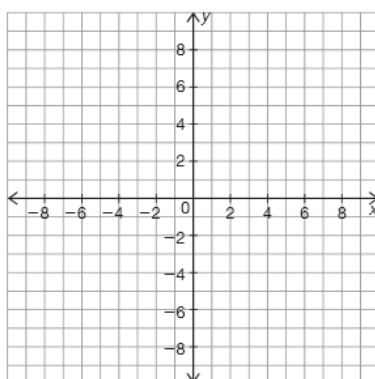
**A Rational Shift in Behavior**  
**Translating Rational Functions**

1. Consider a rational function with one horizontal asymptote at  $y = 0$ , one vertical asymptote at  $x = -5$ , and a  $y$ -intercept at  $(0, 1)$ .
- a. Write a function that meets the given conditions.

- b. Complete the table of values to help you graph the function.

$x$	-10	-7	-6	-5.5	-4.5	-4	-3	0	5
$f(x)$									

- c. Graph the function. Include the asymptotes.



- d. Determine the domain and range of the function.

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page 2

2. The values of the rational function  $g(x)$  are positive and increasing over the interval  $(-\infty, 7)$ . The values of the function  $g(x)$  are negative and increasing over the interval  $(7, \infty)$ . The function  $g(x)$  has a horizontal asymptote at  $y = 0$ . Determine a possible function with the given characteristics. Explain your reasoning.
3. The rational function  $h(x)$  has no  $x$ -intercepts, no  $y$ -intercept, and a vertical asymptote at  $x = 9$ . Determine a possible function with the given characteristics. Explain your reasoning.
4. Melissa and Carl are looking at the given table of values for the rational function  $m(x)$ . The function has a horizontal asymptote at  $y = 0$ . Carl says the function has no vertical asymptotes over the interval  $[-4, 4]$  because the function is not undefined for any of the inputs in the table. Melissa says the function must have at least two asymptotes over the interval  $[-4, 4]$ . Who is correct? Explain your reasoning.

$x$	-4	-3	-2	-1	0	1	2	3	4
$m(x)$	0.073	0.148	0.571	-0.8	-0.444	-0.8	0.571	0.148	0.073

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