

Honors Math Analysis 3.4 Review Worksheet

Warm-ups

Find the domain of each of the following:

a) $R(x) = \frac{5x^2}{3+x}$ b) $G(x) = \frac{6}{(x+3)(4-x)}$ c) $Q(x) = \frac{-x(1-x)}{3x^2-5x-2}$ d) $R(x) = \frac{x}{x^2-16}$

Definition

A RATIONAL function is a function of the form $R(x) = \frac{p(x)}{q(x)}$ where p and q are polynomial functions and q is

not the zero function. A rational function will *usually* have *vertical asymptotes* wherever the domain is restricted.

- I. Simplify each of the following so that they are in the form of a transformation of $f(x) = \frac{1}{x}$ or

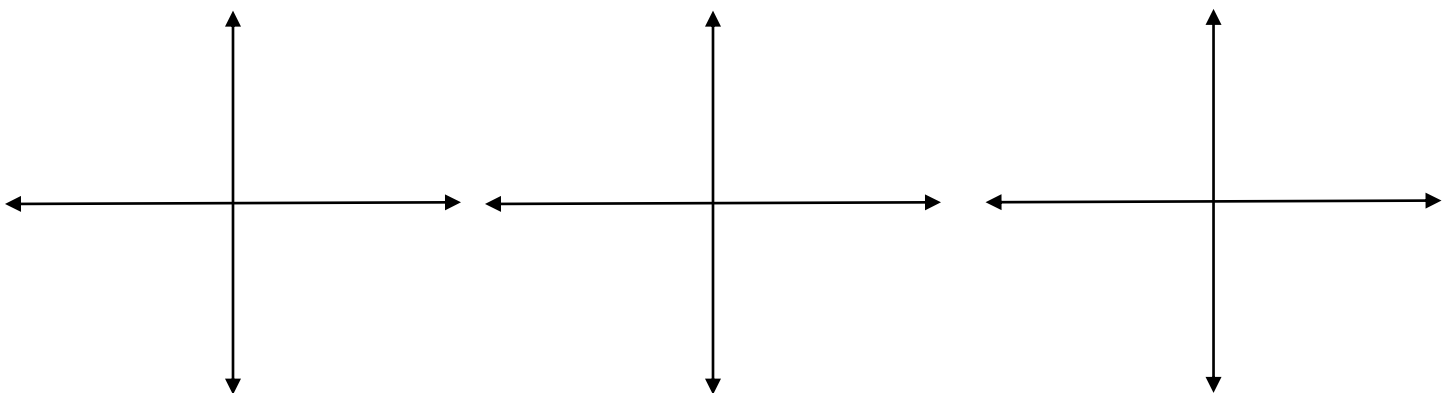
$f(x) = \frac{1}{x^2}$. State the domain of each.

a) $f(x) = \frac{x^2-1}{x^2}$

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

c) $f(x) = \frac{1}{x^2+6x+9}$

- II. Graph (a) through (c) from Part I above. Identify the *horizontal asymptote* (HASY) and *vertical asymptote* (VASY) for each graph.



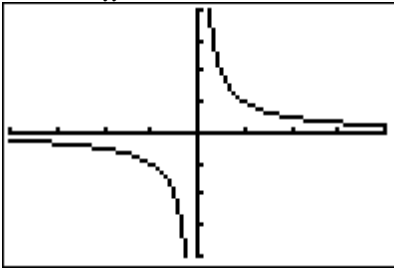
	(a)	(b)	(c)
HASY			
VASY			

III. Recognize

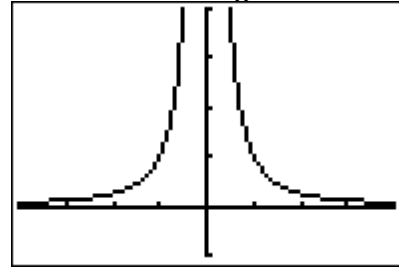
$$f(x) = \frac{1}{x}$$

and

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



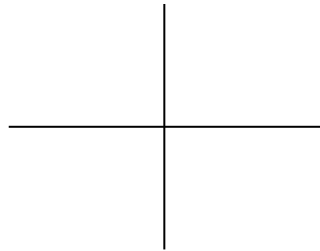
VASY
HASY



VASY
HASY

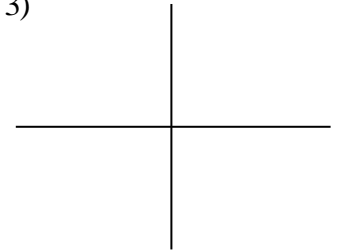
then graph each of the following as transformations of the above rational functions.

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



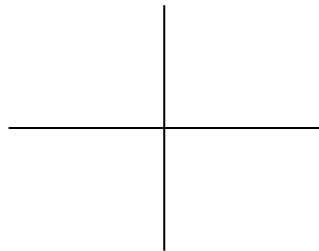
VASY
HASY

b) $h(x) = \frac{1}{(x+3)^2} - 4$



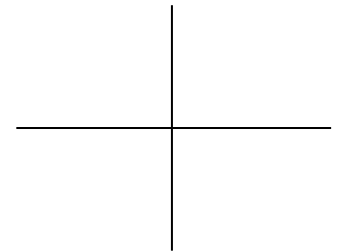
VASY
HASY

c) $h(x) = 2 - \frac{1}{(x+4)^2}$



VASY
HASY

d) $g(x) = \frac{3}{x}$



e) $h(x) = \frac{2}{(x+2)^2}$

