

COLLEGE ALGEBRA

NAME: Holly Gasper

GPS # 37

4.5 RATIONAL FUNCTIONS AND RATIONAL EQUATIONS

Class Time: 11:30 T/T / Date: 4-8-08

Useful Guidelines:

Rational function  $R(x) = \frac{p(x)}{q(x)}$ ,  $q(x) \neq 0$ . Domain:  $= \{x \mid q(x) \neq 0\}$ . Check that  $R(x)$  in lowest terms is *proper*.

(If the highest degree of  $p(x)$  is less than the highest degree of  $q(x)$ , then  $R(x)$  is *proper*.)

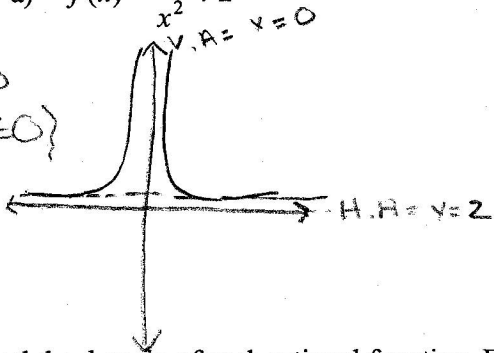
- \* Vertical Asymptote:  $x = r$  (let  $q(x) = 0$  and solve for  $x$ .)
- \* Horizontal Asymptote:  $y = a$  (check the end behavior of  $R(x)$  as  $x \rightarrow \infty$  and  $x \rightarrow -\infty$ .)
- \* Slant/Oblique Asymptote:  $y = mx + b$  (check the end behavior of  $R(x)$  as  $x \rightarrow \infty$  and  $x \rightarrow -\infty$ .)

*20*  
*Graph*  
*h/b*

Graph and find the domain of each rational function. Find horizontal and vertical asymptotes.

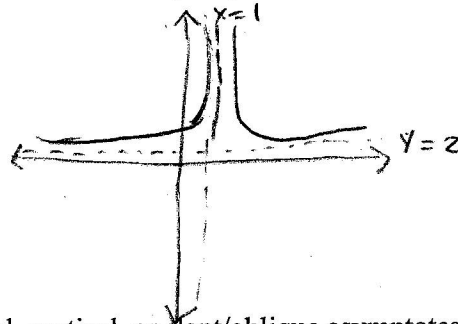
1. a)  $f(x) = \frac{1}{x^2} + 2$

$A = y = 2$   
 $H = x = 0$   
 $D = \{x \mid x \neq 0\}$



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

V.A =  $x = 1$   
H.A =  $y = 2$   
 $D = \{x \mid x \neq 1\}$



Find the domain of each rational function. Find any horizontal, vertical, or slant/oblique asymptotes.

2. a)  $f(x) = \frac{x+4}{x^2-25} = \frac{x+4}{(x-5)(x+5)}$

$D = \{x \mid x \neq \pm 5\}$   
H.A =  $y = 0$   
V.A =  $x = \pm 5$   
S.A = none

b)  $f(x) = \frac{x+8}{x-4}$

$D = \{x \mid x \neq 4\}$   
H.A =  $x = 1$   
V.A =  $x = 4$   
S.A =  $y = 1$

3. a)  $f(x) = \frac{4x^2+x+5}{2x^2-3}$

$D = \{x \mid x \neq \pm \sqrt{\frac{3}{2}}\}$   
H.A =  $y = 2$   
V.A =  $x = \pm \sqrt{\frac{3}{2}}$   
S.A = none

b)  $f(x) = \frac{-x^2+3}{x+5}$

$D = \{x \mid x \neq -5\}$   
H.A = none  
V.A =  $x = -5$   
S.A =  $y = -x + 5$