COLLEGE ALGEBRA

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GPS # 37 **4.5 RATIONAL FUNCTIONS AND RATIONAL EQUATIONS**

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

Useful Guidelines:

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

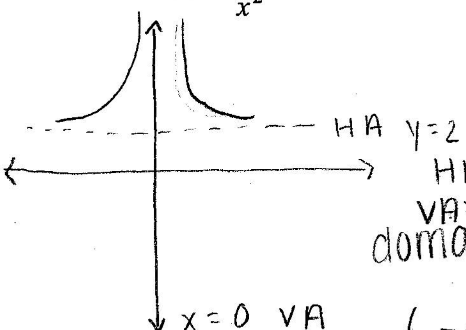
(If the highest degree of $p(x)$ is less than the highest degree of $q(x)$, then $R(x)$ is *proper.*)

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

20/20 Good Job!

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

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



HA= y=2

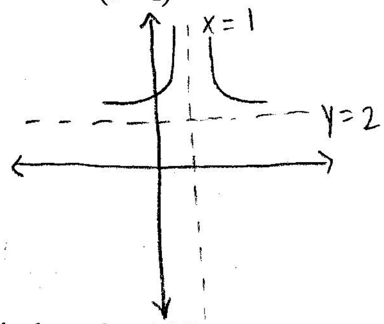
VA= x=0

domain= $\{x \mid x \neq 0\}$

or

$(-\infty, 0) \cup (0, \infty)$

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



HA= y=2

VA= x=1

domain= $\{x \mid x \neq 1\}$

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

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

d: $\{x \mid x \neq \pm 5\}$

VA= x=5, x=-5

HA= y=0

S.A= None

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

d: $\{x \mid x \neq 4\}$

VA= x=4

HA = y=1

S.A = None

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

d: $\{x \mid x \neq \pm\sqrt{3/2}\}$

VA= $x = \pm\sqrt{3/2}$

HA= y=2

S.A= None

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

d: $\{x \mid x \neq -5\}$

VA: x=-5

HA:

S.A: y=-x+5