

COLLEGE ALGEBRA

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

GPS #37 4.5 RATIONAL FUNCTIONS AND RATIONAL EQUATIONS

no graph!

Useful Guidelines:

Rational function $R(x) = \frac{p(x)}{q(x)}$, $q(x) \neq 0$. Domain: $\{x | q(x) \neq 0\}$. 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.)

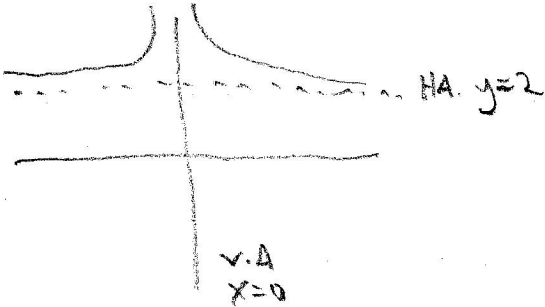
* Vertical Asymptote: $x = r$ (let $q(x) = 0$ and solve for x .)

* Horizontal Asymptote: $y = a$ (check the end behavior of $R(x)$ as $x \rightarrow \infty$ and $x \rightarrow -\infty$.)

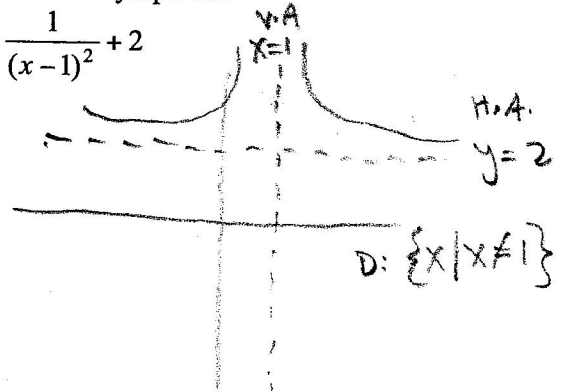
* Slant/Oblique Asymptote: $y = mx + b$ (check the end behavior of $R(x)$ as $x \rightarrow \infty$ and $x \rightarrow -\infty$.)

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

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



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



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

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

D: $\{x | x \neq \pm 5\}$

$(-\infty, -5) \cup (-5, 5) \cup (5, \infty)$

V.A: $x=5$ or $x=-5$

HA: $x=0$ S.A: none

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

D: $\{x | x \neq 4\}$

V.A: $x=4$

H.A: $y=1$

S.A: none

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

$2x^2-3=0$

$2x^2=3$

$x^2 = \frac{3}{2}$

$x = \pm \sqrt{\frac{3}{2}}$

D: $\{x | x \neq \pm \sqrt{\frac{3}{2}}\}$

$(-\infty, -\sqrt{\frac{3}{2}}) \cup (-\sqrt{\frac{3}{2}}, \sqrt{\frac{3}{2}}) \cup (\sqrt{\frac{3}{2}}, \infty)$

V.A: $x = \pm \sqrt{\frac{3}{2}}$ S.A: none

H.A: $y=2$

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

D: $\{x | x \neq -5\}$

V.A: $x=-5$

$= -x + 5 - \frac{22}{x+5}$

S.A: $y = -x + 5$

$$\begin{array}{r} -x+5 \\ x+5 \overline{) x^2+3} \\ \underline{-x^2-5x} \\ 3+5x \\ \underline{-(3+5x)} \\ -22 \end{array}$$