COLLEGE ALGEBRA

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GPS # 39 **4.5 RATIONAL FUNCTIONS AND RATIONAL EQUATIONS III**

Class Time: 1130 Date: 4/10/8

Useful Guidelines:

To analyze the graph of a rational function, $R(x)=\dfrac{p(x)}{q(x)}$, in lowest terms:

* Step 1: Find the domain of the rational function. → denominator ≠ 0

* Step 2: Find the x-intercept(s), if any (let $p(x)=0$ when $R(x)$ is in lowest term), and the y-intercept(s), $R(0)$.

* Step 3: Write R in lowest term and find the real zeros of the denominator (vertical asymptotes).

* Step 4: Find the horizontal or slant asymptotes, if any. – only if numerator's degree > than denominator

* Step 5: Find the intervals on which R is above the x-axis and the intervals on which R is below the x-axis. [Hint: pick a point between the zeros obtained from both the numerator and the denominator.]

* Step 6: Graph the asymptotes, if any, plot the points, connect the points and graph R.

20/20 Good Job!

1. Analyze the graph of the following rational function by following Step 1 through 6 above.

$$R(x)=\frac{24}{x^2-4}$$

1) D: $\{x \mid x = \pm 2\}$

2) x-intercept (y = 0) x-int = None
+
y-intercept (x = 0) y int = (0, −6)

3) V.A = $x = \pm 2$

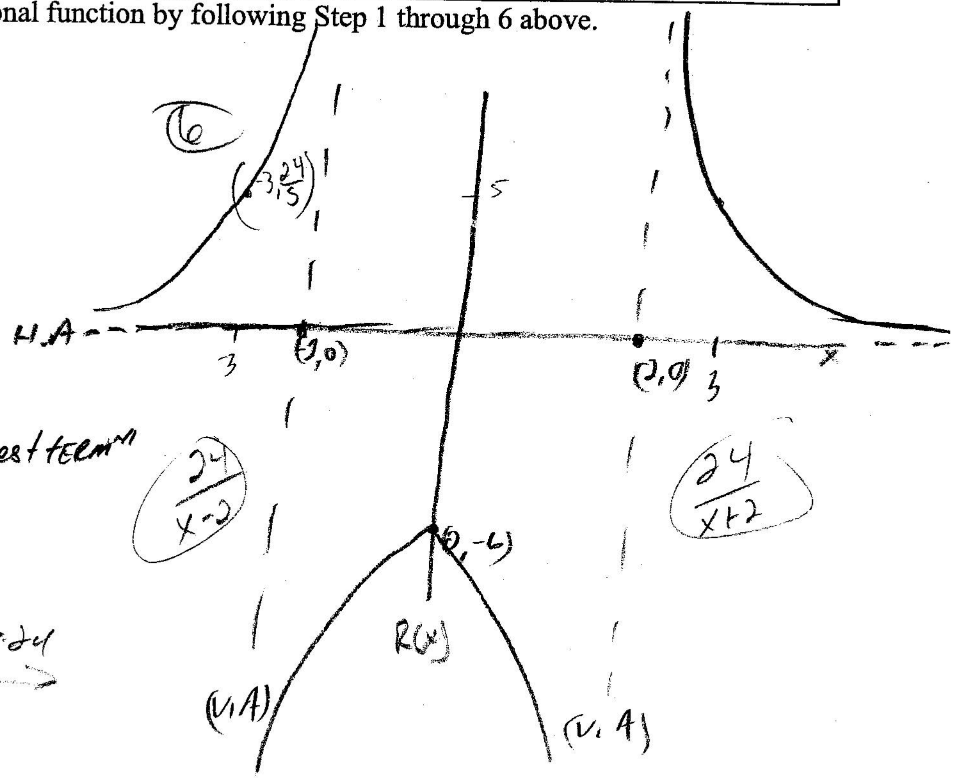
$R(x) = \dfrac{24}{x^2-4} = \dfrac{24}{(x+2)(x-2)}$ = "lowest term"

4) H.A. = (y = 0) S.A = NONE

5) R(−3) = 24/5 R(0) = −6 R(3) = 24/5

(+) −2 (−) 2 (+)

6)



2. Solve the rational equation and give the solution set.

a) $\dfrac{x}{x-5}+1=-3$

$(x-5)\dfrac{x}{(x-5)} = -4(x-5)$

$x = -4x + 20$
$+4x \quad +4x$

$\dfrac{5x}{5} = \dfrac{20}{5}$

$x = 4$

sol set $\{x \mid x = 4\}$

b) $\dfrac{16}{x^2-4}=2$

$(x^2-4)\dfrac{16}{x^2-4} = 2(x^2-4)$

$16 = 2(x^2-4)$

$16 = 2x^2 - 8$
$+8 \quad +8$

$\dfrac{24}{2} = \dfrac{2x^2}{2}$

$\sqrt{12} = \sqrt{x^2}$

(4·3)

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

sol set $\{x \mid x = \pm 2\sqrt{3}\}$