4-24-08 10:00 final exam

COLLEGE ALGEBRA

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GPS # 39 **4.5 RATIONAL FUNCTIONS AND RATIONAL EQUATIONS III** Class Time: 11:30 T/Th Date: 4-10-08

20/20 Good Job!

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.
* 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.
* 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.

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

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

$\dfrac{24}{x^2-4} = 0$ $24 \neq 0 \rightarrow$ x int

1. D: $\{x \mid x \neq \pm 2\}$

2. x int: none
y int: $(0,-6)$

$\dfrac{24}{0^2-4} = -6 \rightarrow$ y int

3. VA = $x = \pm 2$

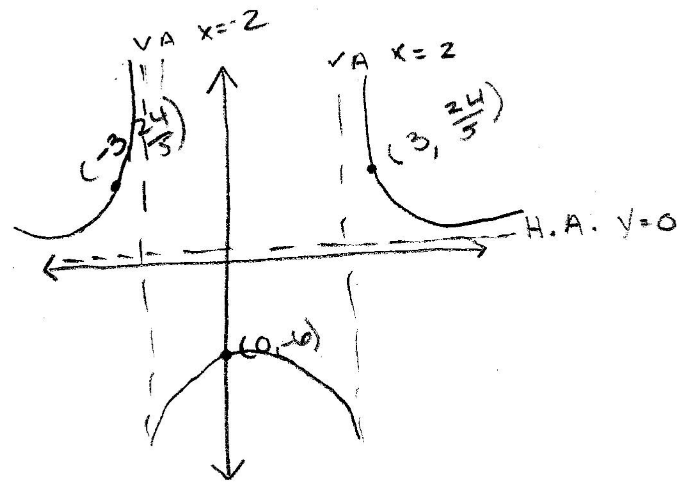
$R(x) = \dfrac{24}{x^2-4} = \dfrac{24}{(x-2)(x+2)}$ lowest term

4. H.A = $y=0$
S.A = none

5. + − + (−2, 2)

$R(-3) = \frac{24}{5}$ $R(0) = -6$ $R(3) = \frac{24}{5}$

6)



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

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

$-1 \quad -1$

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

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

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

$x = 4$

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

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

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

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

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

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

$x = \sqrt{12}$

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