Quiz Rational Functions 2012 version 1.doc **Name:**_____

1) Match each equation with its graph below.

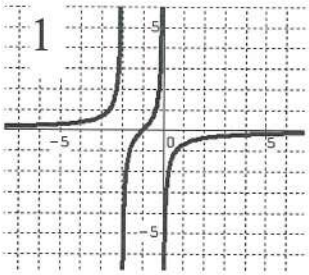
4 $f(x)=\dfrac{x^2-1}{x^2+2x}$

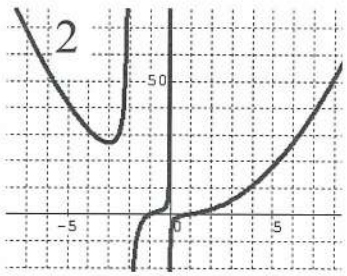
1 $g(x)=\dfrac{-x-1}{x^2+2x}$

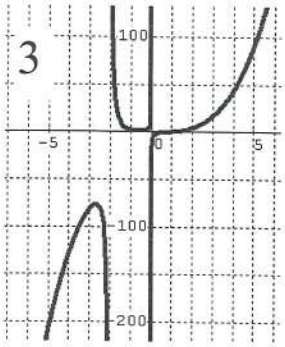
2 $h(x)=\dfrac{x^4+1}{x^2+2x}$

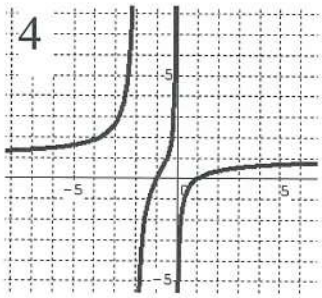
5 $j(x)=\dfrac{x^3-1}{x^2+2x}$

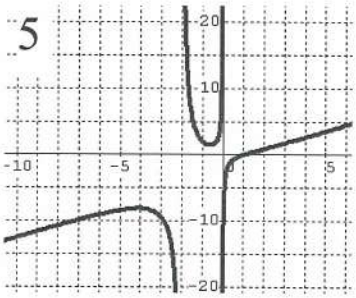
6 $k(x)=\dfrac{-x^2-1}{x^2+2x}$

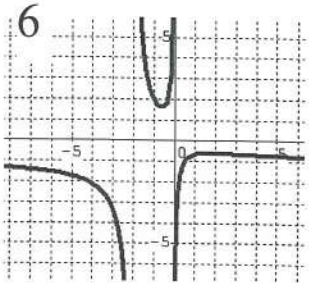












2) For the functions below find the x and y intercepts and vertical and horizontal asymptotes.

(a) $f(x)=\dfrac{5x+1}{3x^2+1}$

y-intercept(s): 1 x-intercept(s): $-\frac{1}{5}$

Vertical asymptote(s): $x =$ NONE

Horizontal asymptote: $y =$ 0

(b) $f(x)=\dfrac{2x^2+11x+5}{x^2+3x}$

y-intercept(s): NONE x-intercept(s): $-5, -\frac{1}{2}$

Vertical asymptote(s): $x =$ 0, −3

Horizontal asymptote: $y =$ 2

3) Given the following information about a rational function, make a sketch of the function.

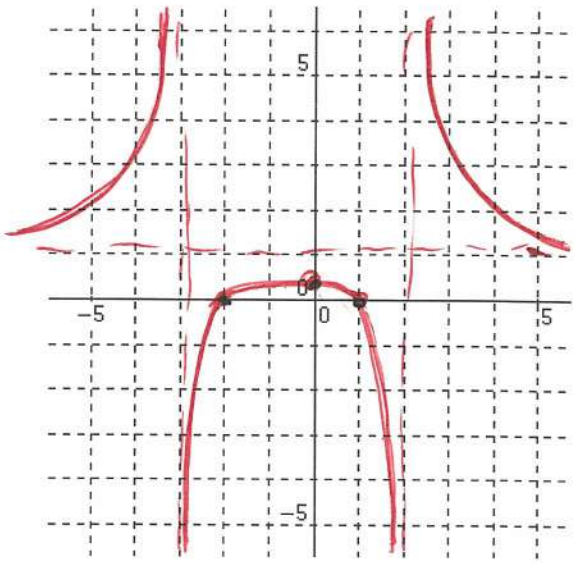
$$y = \frac{x^2 + x - 2}{x^2 + x - 6}$$

y-intercept: $y = \frac{1}{3}$

x-intercepts: $x = -2, x = 1$

Vertical asymptotes: $x = -3, x = 2$

Horizontal Asymptote: $y = 1$



4) Given the following information about a rational function, make a sketch of the function.

$$y = \frac{-x}{x^2 - 3x - 4}$$

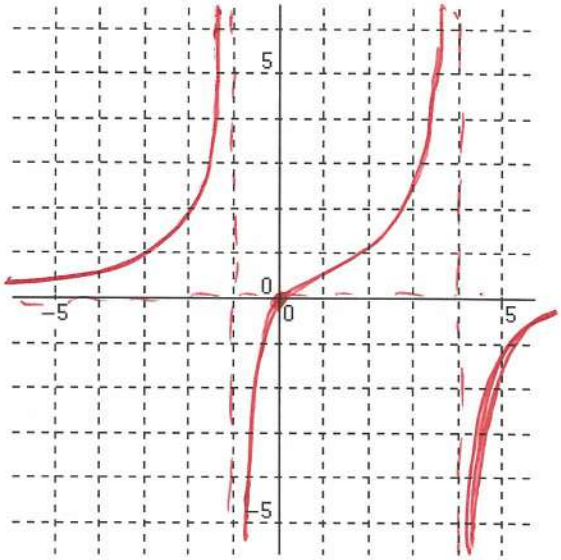
$- \quad + \quad -$

y-intercept: $y = 0$

x-intercepts: $x = 0$

Vertical asymptotes: $x = -1, x = 4$

Horizontal Asymptote: $y = 0$



5) Find the equation of the slant asymptote of h(x).

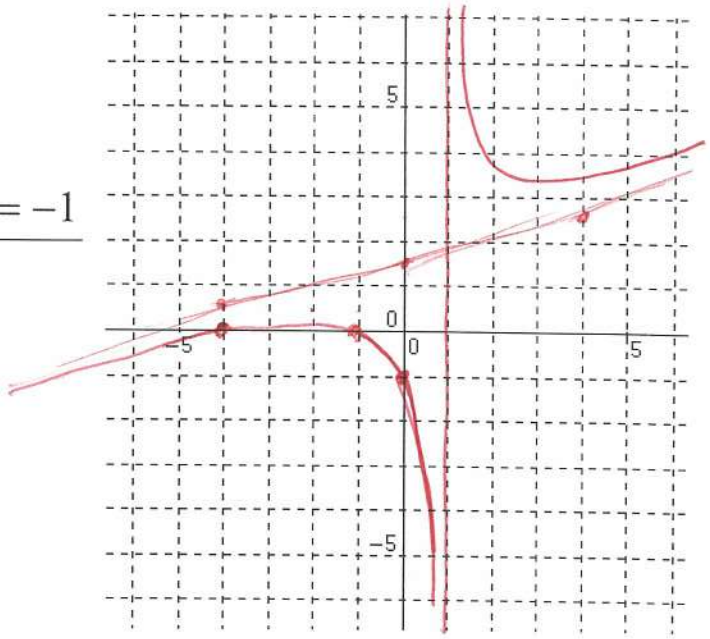
$$h(x) = \frac{3x^3 - 4x^2 + 5x - 1}{x^2 + x}$$

$$\begin{array}{r} 3x - 7 \\ x^2 + x \overline{)\, 3x^3 - 4x^2 + 5x - 1} \\ -(3x^3 + 3x^2) \\ \hline -7x^2 + 5x - 1 \\ -7x^2 - 7x \\ \hline 12x - 1 \end{array}$$

Slant asymptote: $y = 3x - 7$

6) Given the following information about a rational function, make a sketch of the function.

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



y-intercept(s): $y = -1$ x-intercept(s): $x = -4, x = -1$

Vertical asymptote(s): $x = 1$

Horizontal or slant asymptote(s): $y = \frac{1}{4}x + \frac{3}{2}$

7) Determine the two missing terms in the unfinished long division problem below.

$$x^2 + 2x \overline{)\ 2x^5 + 8x^4 + 0x^3 - 6x^2 - x + 1}$$

$$2x^3 + 4x^2 - 8x + 10$$

$$-(2x^5 + 4x^4)$$

$$4x^4 + 0x^3 - 6x^2 - x + 1$$

$$-(4x^4 + 8x^3)$$

$$-8x^3 - 6x^2 - x + 1$$

$$-(-8x^3 - 16x^2)$$

$$10x^2 - x + 1$$

$$-(10x^2 + 20x)$$

$$-21x + 1$$

BONUS QUESTION: Find a possible equation for the graph of the polynomial function below.

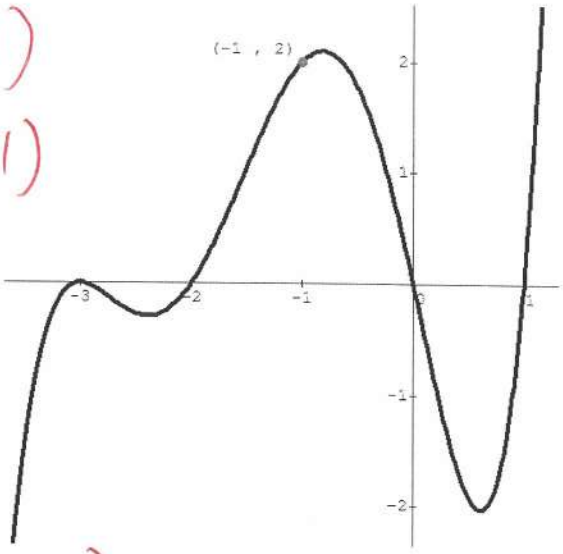
$y = k(x+3)^2(x+2)(x)(x-1)$

$2 = k(-1+3)^2(-1+2)(-1)(-1-1)$

$2 = k(4)(1)(-1)(-2)$

$2 = k(8)$

$k = \frac{1}{4}$



Equation: y = $\frac{1}{4}(x+3)^2(x+2)(x)(x-1)$