Rational Function Cards: Investigation 1

Holes and vertical asymptotes are shown for you. Use your graphing calculator to complete a sketch of each graph. Show each rational function in factored form. What causes a vertical asymptote? What causes a hole in the graph?

$f(x) = \dfrac{2x^2 + x - 3}{4x^2 - 3x - 1}$

Factored:

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

Factored:

$f(x) = \dfrac{3x^2 - x - 2}{4x - 4}$

Factored:

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

Factored:
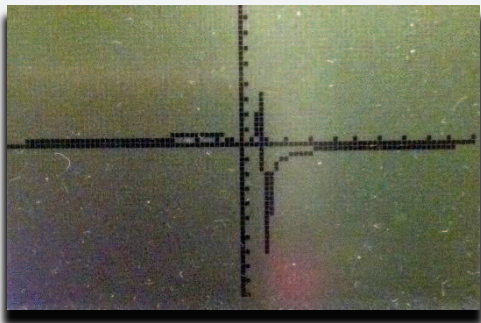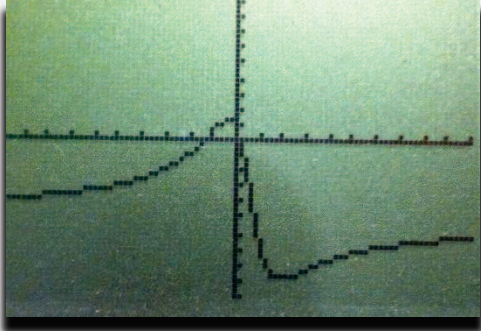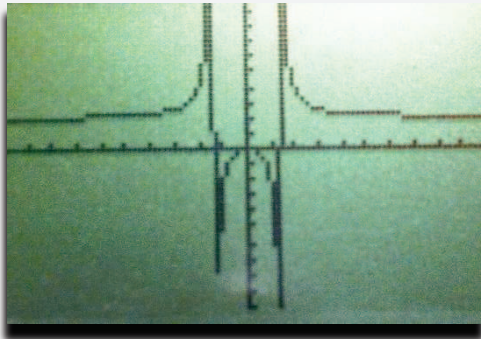
$f(x) = \dfrac{x^2 - x - 20}{x^2 - x - 2}$

Factored:

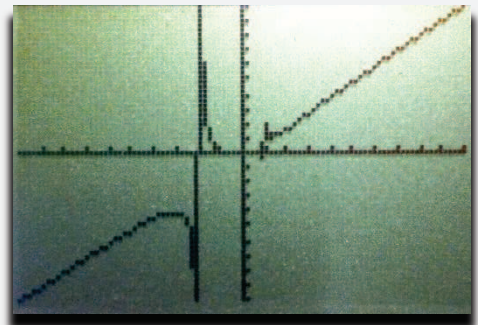$f(x) = \dfrac{2x^2 + 5x - 3}{3x^3 + 11x^2 + 6x}$
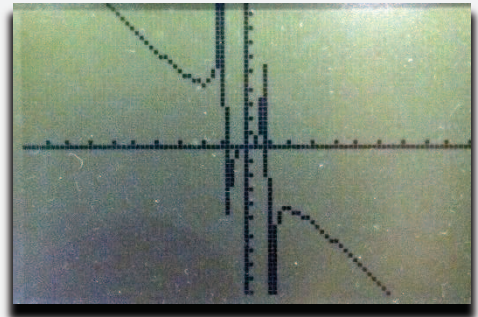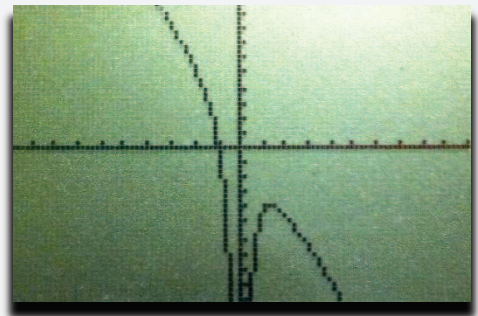
Factored:

When looking at the equation for a rational function, how can you tell WHERE the vertical asymptote(s) will be? How can you tell where the holes will be?

Reference Sheet:
Samples of Horizontal and Slant Asymptotes

Horizontal Asymptotes

Slant Asymptotes

Rational Function Cards
Investigation 2

Use your graphing calculator to graph each rational function. Use the reference sheet for samples of horizontal and slant asymptotes. Determine which type of asymptote is present in each rational function. What causes a horizontal asymptote? What causes a slant asymptote?

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

$$f(x) = \frac{x^3 - 4}{2x^2 - 4}$$

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

$$f(x) = \frac{8x^2}{4x^2 - 1}$$

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

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

$$f(x) = \frac{x^4}{2x^3 + 1}$$

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

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

$$f(x) = \frac{5x^2 + 6x - 1}{x^2 - x + 2}$$

Can you determine how to tell WHERE a horizontal asymptote will be? How can you find the equation of the line for a slant asymptote?