Today's Plan:

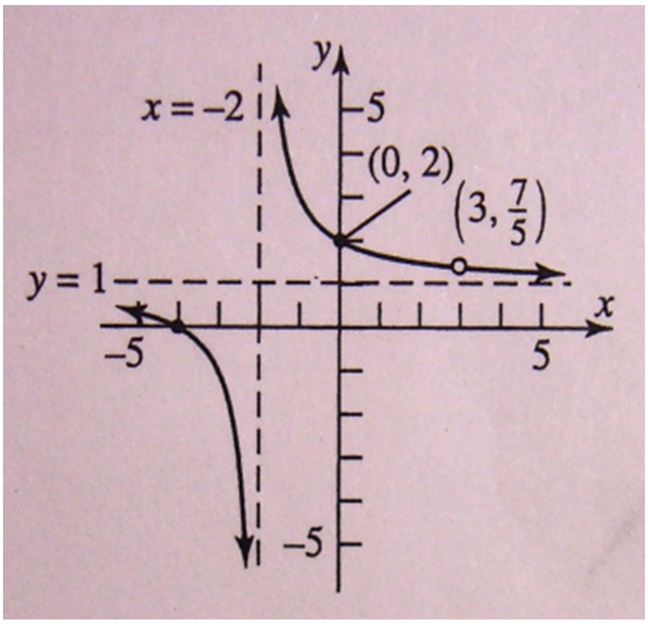
Learning Target (standard): I will graph rational functions using the 7-step process.

Students will: Complete practice problems over previous concepts at the boards, put up homework problems on the board and make necessary corrections to their own work, take notes over new material and complete practice problems over new concepts.

Teacher will: Provide practice problems over previous concepts, check homework problems for accuracy and provide students feedback, describe and provide examples of new concepts and assign students assessment problems over new concepts.

Assessment: Board work, homework check and homework assignment

Differentiation: Students will work at the board, go over and correct homework at their seats, actively engage in lecture over new concepts, practice new concepts with the aid of other students and the teacher and complete homework assignment.



D: $\{x \mid x \neq -2, 3\}$

R: $\{y \mid y \neq 1, \frac{7}{5}\}$

VA: $x = -2$

HA: $y = 1$

OA: —

Holes: $(3, \frac{7}{5})$

Find the asymptote(s) and holes:

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

$x+4=0$

$x=-4$

VA: $x=-4$

HA: $y=3$

OA: —

Holes: —

Find the asymptote(s) and holes:

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

$x^3+3x=0$

$x(x^2+3)=0$

$$\begin{array}{r|l} & 3x \\ \hline x^3+3x & 3x^4+0x^3+0x^2+0x+4 \\ & -3x^4 \quad - 9x^2 \\ \hline & -9x^2+0x+4 \end{array}$$

VA: $x=0$

HA: —

OA: $y=3x$

Holes: —

Find the asymptote(s) and holes:

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

$x^2+4x=0$

$x(x+4)=0$

VA: $x=0, x=-4$

HA: $y=0$

OA: —

Holes: —

Find the asymptote(s) and holes:

$$f(x) = \frac{8x^2+26x+15}{2x^2-x-15}$$

$2x^2-x-15=0$

$(2x+5)(x-3)=0$

$x=-\frac{5}{2}, 3$

VA: $x=3$

HA: $y=4$

OA: —

Holes: $\left(-\frac{5}{2}, \frac{14}{11}\right)$

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

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

$$f\left(-\frac{5}{2}\right)=\frac{4\left(-\frac{5}{2}\right)+3}{-\frac{5}{2}-3}$$

$$=\frac{-10+3}{-\frac{11}{2}}$$

$$=\frac{-7}{-\frac{11}{2}}=-7\cdot-\frac{2}{11}$$

$$f\left(-\frac{5}{2}\right)=\frac{14}{11}$$

Analyzing the Graph of a Rational Function 7-Step Process

- Step 1: Factor the function. Find the domain of the rational function. <- non-reduced

Reduce!!

- Step 2: Locate the intercepts, if any, of the graph. The x-intercepts, if any, of $f(x) = g(x)/h(x)$ satisfy the equation $\underline{g(x) = 0}$.

I_x: (x,0) I_y: (0,y)

Graphing cont.

$f(-x) = f(x)$ even

$f(-x) = -f(x)$ odd

- Step 3: Test for symmetry. If it is even, it has symmetry with respect to the y-axis, and if it is odd, it has symmetry with respect to the origin.

- Step 4: With f(x) in lowest terms, each zero in the denominator will give rise to a vertical asymptote. Any “reduced zeros” will result in a hole.

* undefined locations *

Graphing cont.

"end behavior"

- Step 5: Locate the horizontal or oblique asymptotes. Determine points, if any, at which the graph of f(x) intersects these asymptotes. "value" of EB = f(x)

  *solve - if possible, intersects

- Step 6: Use the "chart" to determine where the graph is above or below the x-axis.

  +/- chart

Putting It All Together

- Step 7: Graph the asymptotes, if any. Plot the points found in Steps 2, 5, and 6. Connect the points.

Good Luck!!