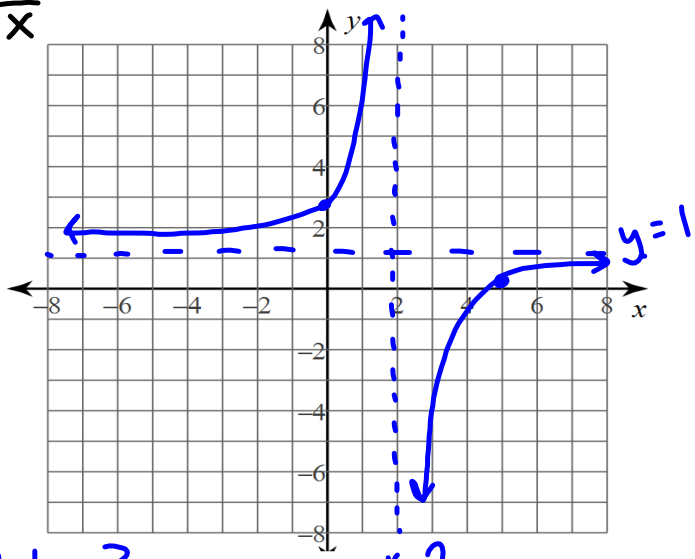
Graph the following function, label asymptotes, and x- and y-intercepts. $f(x) = \frac{1}{x}$

$$f(x) = \frac{a}{x-h} + k$$

h shift L or R
k shift ↑ or ↓
a is a dilated

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

→2 ↑1



VA: x=2
HA: y=1

dilated by 3
reflected across y-axis

x-int:

$(x-2)-1 = -\frac{3}{(x-2)}\cdot(x-2)$

$-x+2 = -3$
$-2 \quad -2$

$-x = -5$

$x = 5$

(5,0)

y-int:

$\frac{-3}{-2} + 1$

$\frac{3}{2} + 1$

$\frac{5}{2}$ or 2.5

(0, 2.5)

4.7 Graphing Rational Functions

A Practice Understanding Task

Part I: Seeing Structure

For each function, determine intercepts, domain, asymptotes, and complete a sign line. Use this information to sketch the graph.

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

$x^2+1=0$, $\sqrt{x^2}=\sqrt{-1}$, $x=\pm i$

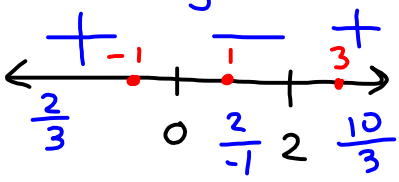
d2 / d2

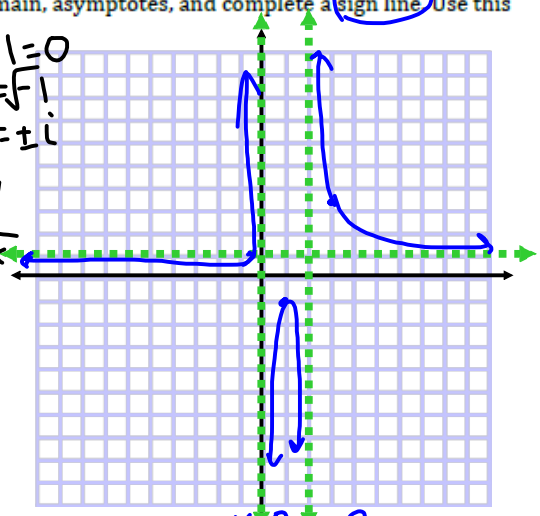
x^2-2x ↘ x^2+1

VA: $x=0, 2$

HA: $y=\frac{1}{1}=1$

Slant Asy: none





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

$1x^3+\dots$

d1 / d3 proper

VA: $x=1, -2$

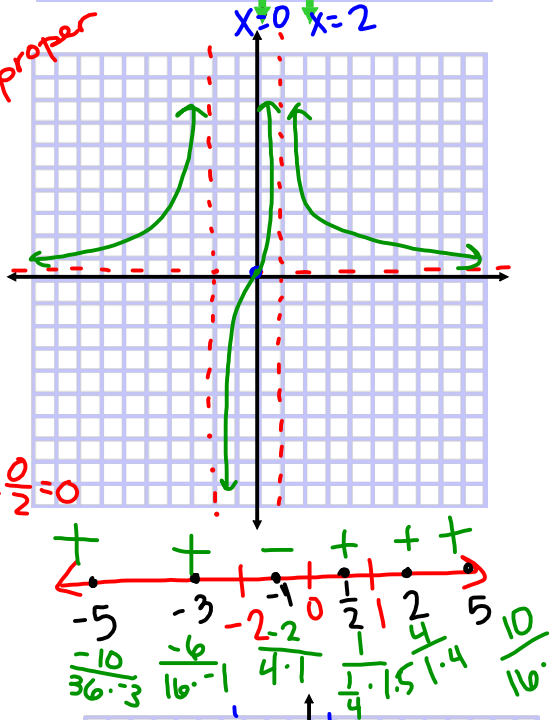
HA: $y=0$ (x-axis)

x-intercept: $x=0$

y-intercept: $\frac{2\cdot 0}{(0-1)^2(0+2)} = \frac{0}{(-1)^2(2)} = \frac{0}{2} = 0$

x-intercepts

Vert. asymptotes



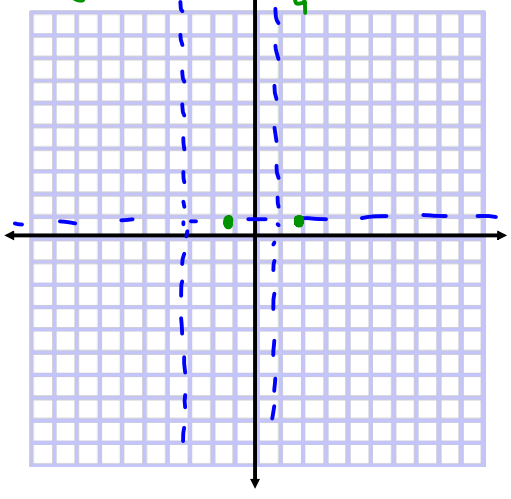
3. $f(x) = \frac{(x+1)(x-2)}{(x+3)^2(x-1)}$

d2 / d3

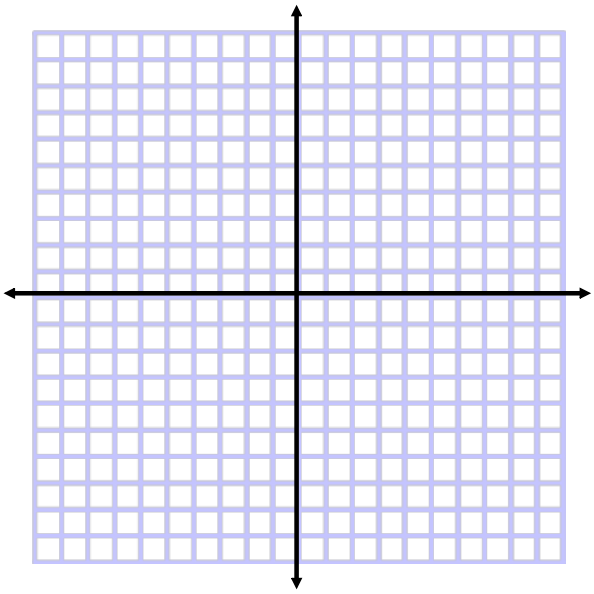
VA: $x=-3, 1$

HA: $y=0$

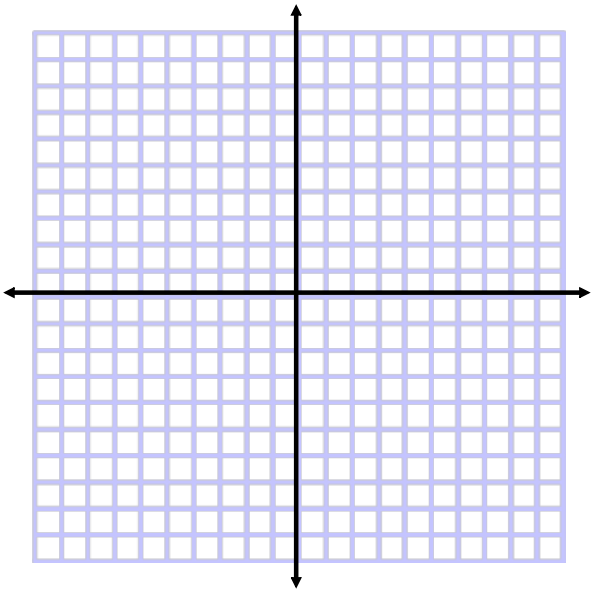
x-int: $x=-1, 2$



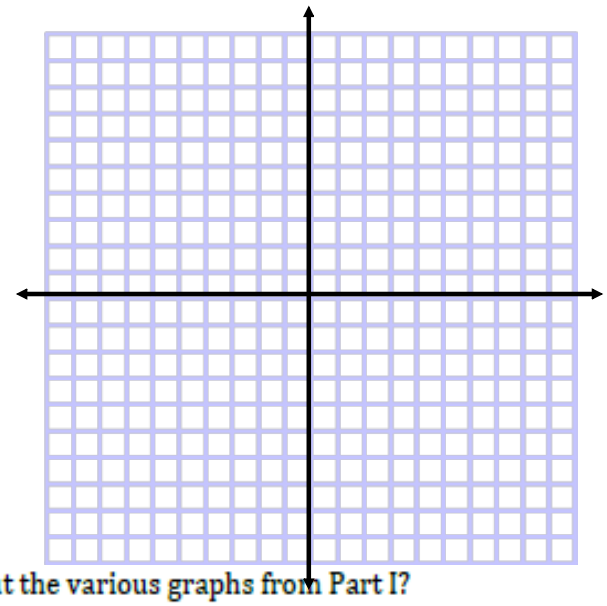
4. $f(x) = \frac{(x-1)^2}{x^3+4x}$



5. $f(x) = \frac{3x^2}{x^2-9}$



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

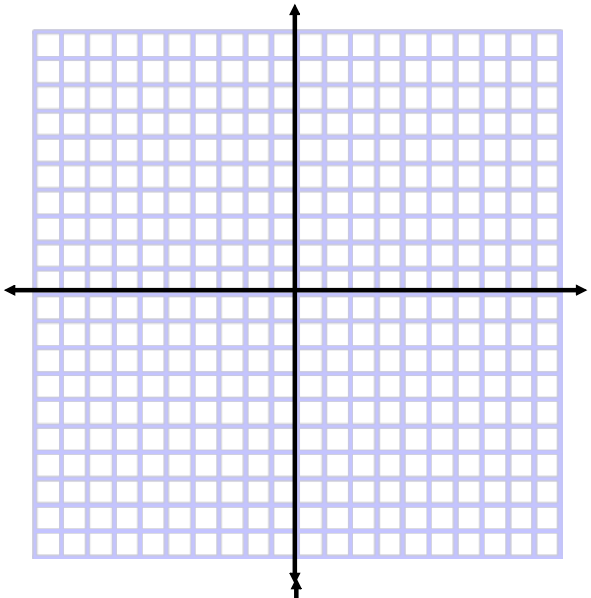


7. What observations do you notice about the various graphs from Part I?

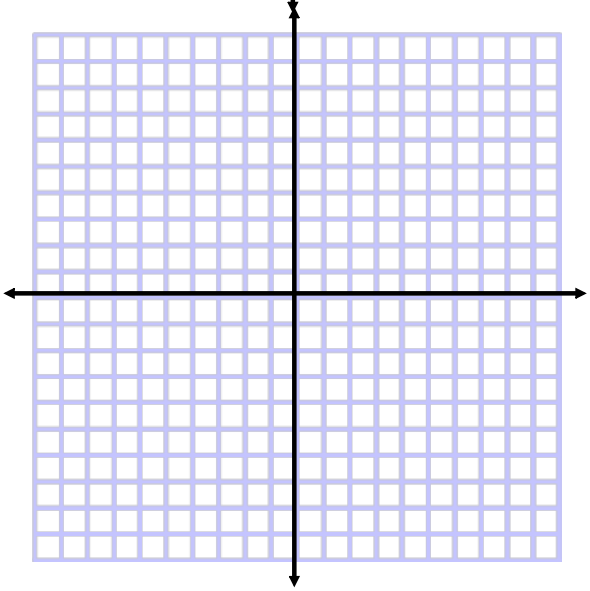
Part II: Seeing More Structure

8. Determine the features and then sketch the graphs of the functions.

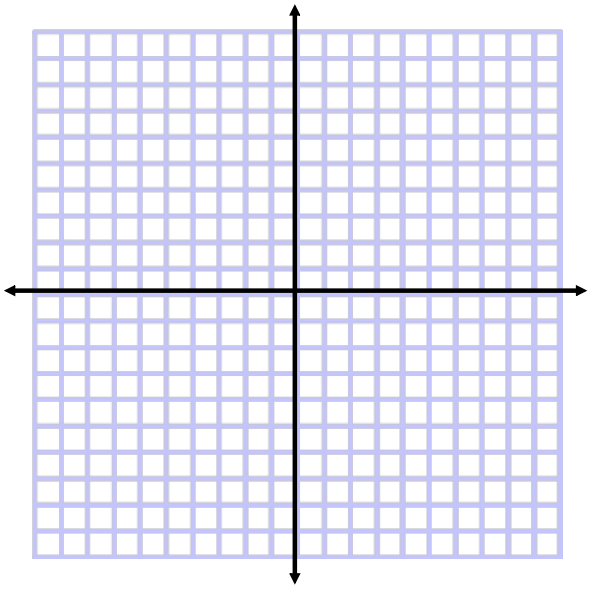
a. $f(x) = \frac{x}{x^2+1}$



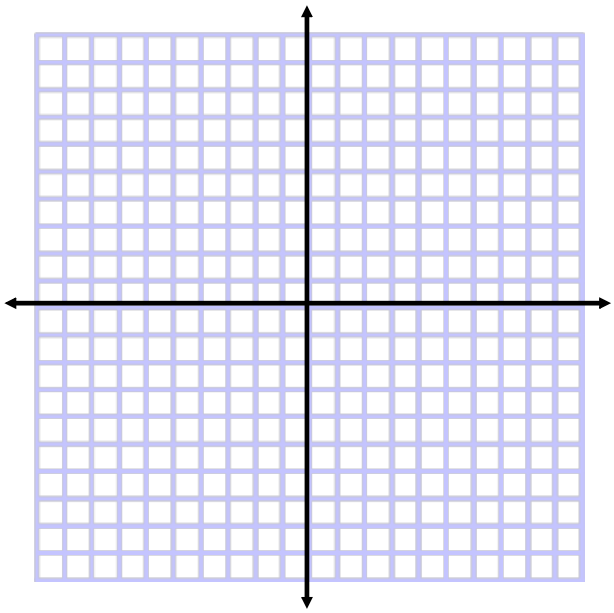
b. $f(x) = \frac{2x\,(x-1)(x+2)}{(x+4)}$



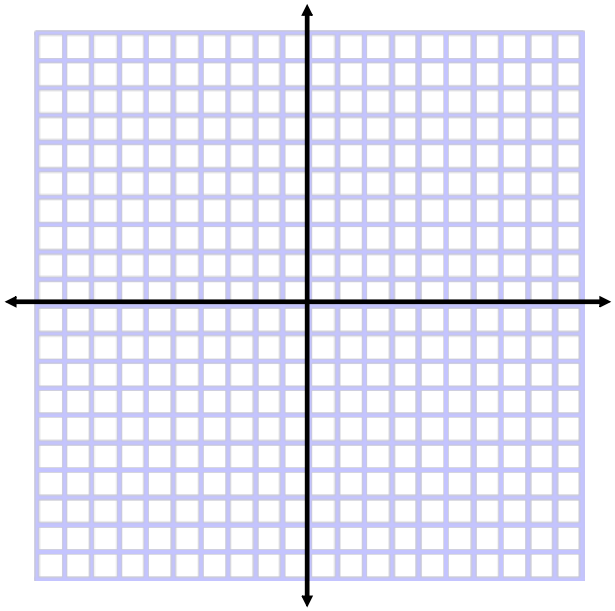
c. $f(x) = \frac{(2x-1)(x+2)}{(x+3)(x-1)}$



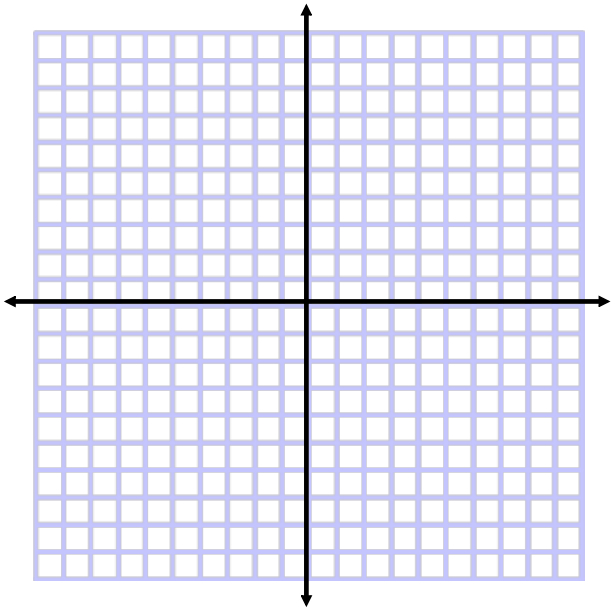
d. $f(x) = \frac{3x(x+2)}{(x+3)(x-1)}$



e. $f(x) = \frac{(x-1)^2(x+2)}{(x+1)^2}$



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



Feb 19-7:54 AM

Homework/Classwork

-Finish 4.7 "Ready, Set, Go"

Oct 21-8:47 AM