10-2a: Asymptotes of Rational Functions

Holes and Vertical asymptotes

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

Find the holes and vertical asymptotes:

a. $y = \dfrac{5x}{x+2}$

b. $y = \dfrac{2x^3}{x-5}$

c. $y = \dfrac{x+2}{(x-2)(x+2)}$

d. $f(x) = \dfrac{x^2-9}{x^2-5x+6}$

X and Y Intercepts

Y intercepts, x = 0

$$f(x)=\frac{3x-12}{x^2-5x-6}$$

X intercepts, y = 0

$$f(x)=\frac{3x-12}{x^2-5x-6}$$

Find the x and y intercepts of the following functions:

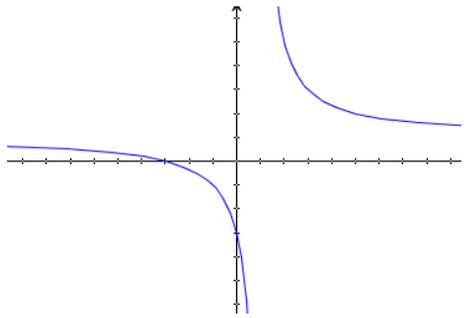
$$f(x)=\frac{x^2-2x-3}{x+2}$$

$$f(x)=\frac{3x-5}{x^2-5x+6}$$

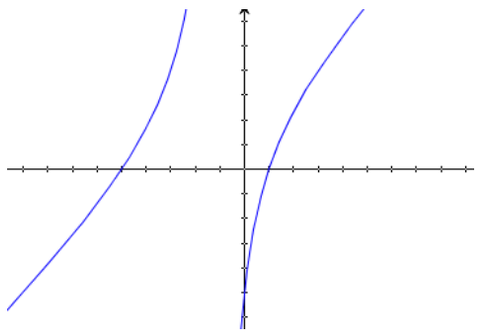
End Behavior Models

Look at the graphs, see if you can find the end behavior models. What are the patterns?

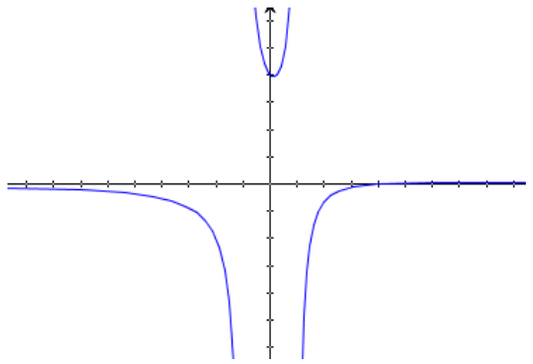
$$f(x)=\frac{x+3}{x-1}$$



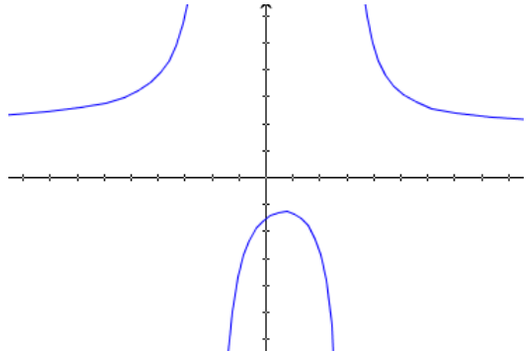
$$f(x)=\frac{(x+5)(x-1)}{x+1}$$



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



$$f(x)=\frac{2x^2-3x+9}{x^2-x-6}$$



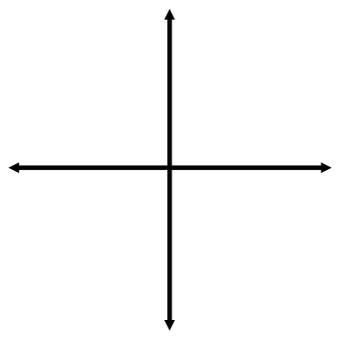
End Behavior:

To find the end behavior, compare the degrees of the numerator and denominator.

Top heavy: more later
Bottom heavy: $y = 0$
Equal: divide leading coefficients

Identify the x and y intercepts, vertical asymptotes, end behavior, and then make a sketch.

$f(x) = \dfrac{-3}{x-1}$



$f(x) = \dfrac{3x-7}{x-2}$