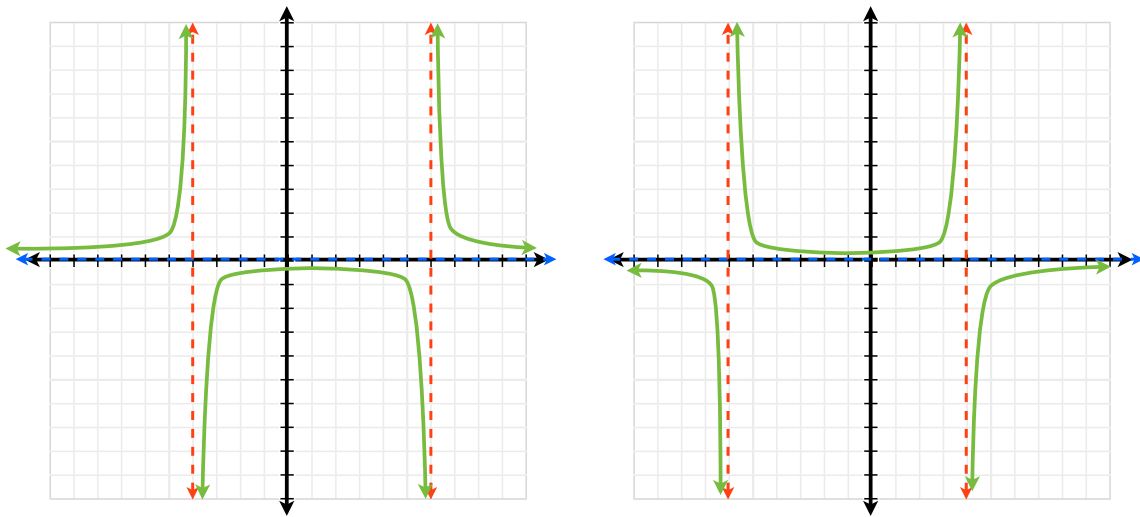


## Shape of rational functions with two vertical asymptotes



A function that can be written in the form...

$$y = \frac{p(x)}{q(x)} \text{ where } p(x) \text{ and } q(x) \text{ are polynomials}$$

**Vertical** Asymptotes

set  $q(x) = 0 \Rightarrow q(x) = \text{quadratic}$

**Horizontal** Asymptote

if  $\deg p(x) > \deg q(x)$ , no horizontal asymptote.

if  $\deg p(x) < \deg q(x)$ ,  $y = 0$

if  $\deg p(x) = \deg q(x)$ , divide leading coefficients

Zero or  $x$ -intercept

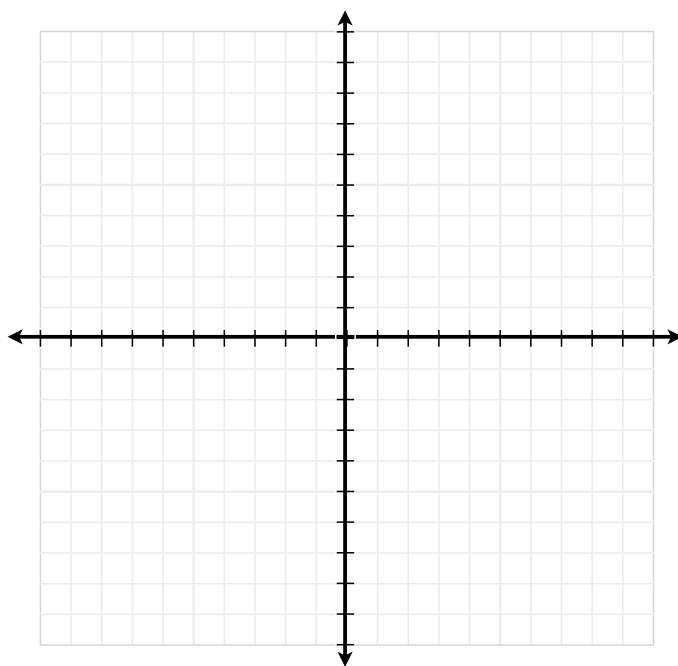
Set  $y = 0$ , solve for  $x$

$y$ -intercept

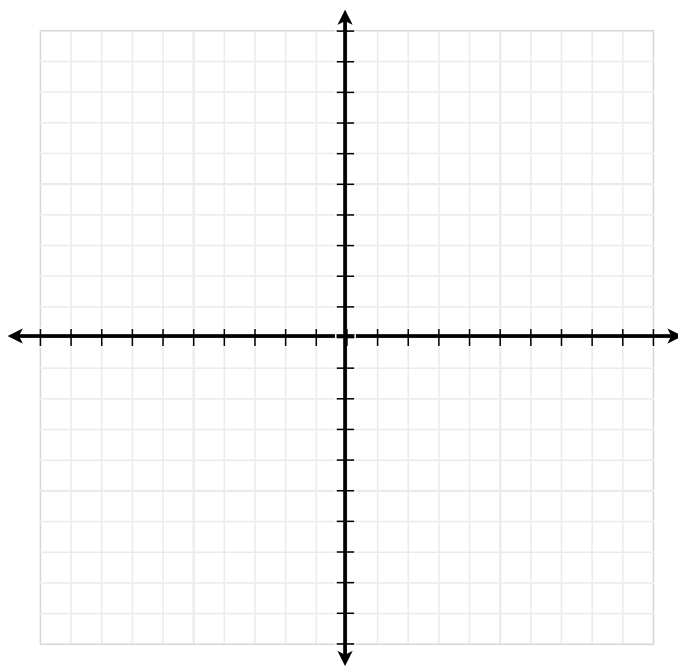
Set  $x = 0$ , solve for  $y$

**vertex** of parabolic shape

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



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



$$y = \frac{2}{x^2 - 9}$$

