

Graphing Rational Functions:

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

Steps to graphing rational functions

1. Factor numerator and denominator
2. Cancel out common factors: Holes in Graph
3. Remaining zeros of numerator with multiplicity: x -intercepts
4. Remaining zeros of denominator: vertical asymptotes
5. Ratio of leading terms: Horizontal Asymptotes and "End Behavior"
6. Plug in $x = 0$: y -intercept

Graph x -intercepts with local behavior:

Graph y -intercept:

Graph vertical asymptotes (dotted line):

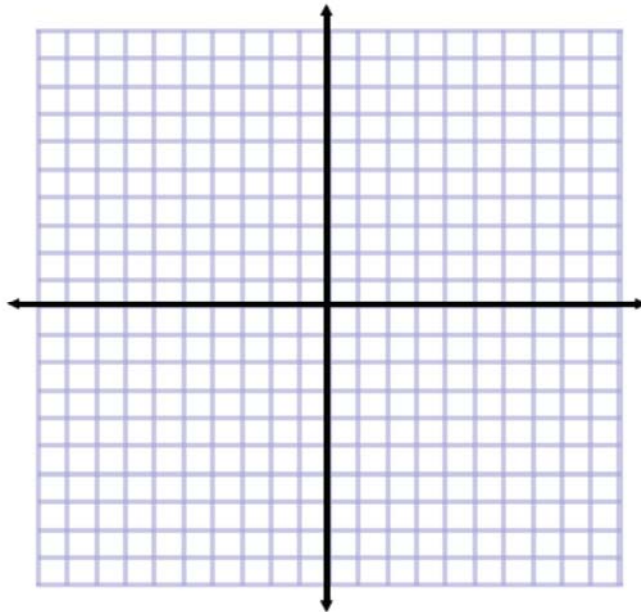
Graph horizontal asymptotes (dotted line):

Degree of Rational Function: End behavior

Make a sign chart:



Draw the graph: make sure to connect the dots, but the vertical asymptotes and holes are OFF limits because they are not in the domain.



Example:

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

Graph x -intercepts with local behavior:

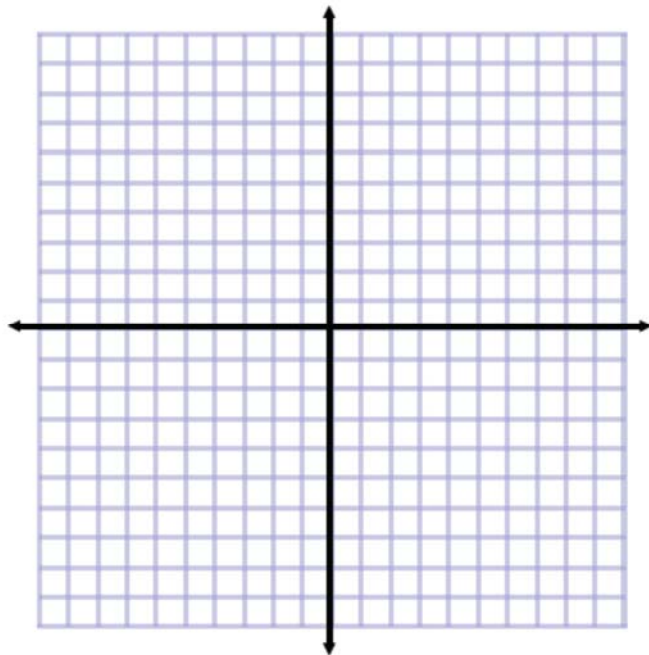
Graph y -intercept:

Graph vertical asymptotes (dotted line):

Graph horizontal asymptotes (dotted line):

Degree of Rational Function: End behavior

Make a sign chart:



Example:

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

Graph x -intercepts with local behavior:

Graph y -intercept:

Graph vertical asymptotes (dotted line):

Graph horizontal asymptotes (dotted line):

Degree of Rational Function: End behavior

Make a sign chart:

