Guidelines for Analyzing graphs of Rational Functions.

1. Simplify $f(x)$:   FACTOR

2. Find the Holes (if any)

3. Find the Asymptotes

   a) vertical

   b) horizontal

   c) slant, parabolic, etc.

4. Find the Zeros

5. Find the y-intercept

6. Find the domain and range

Determine if the given Rational Function has any holes.
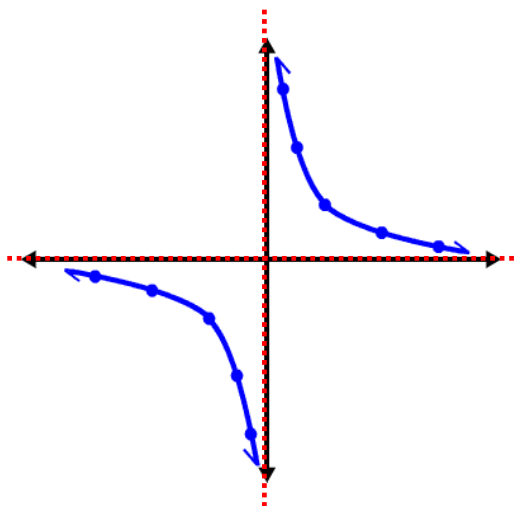
Hole: same factor in the numerator and denominator

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

Pull
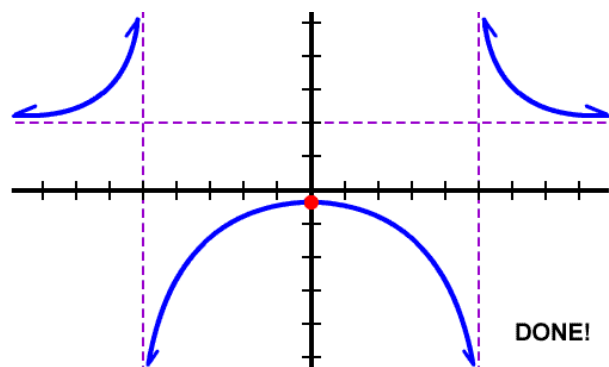
Determine if the given Rational Function has any holes.
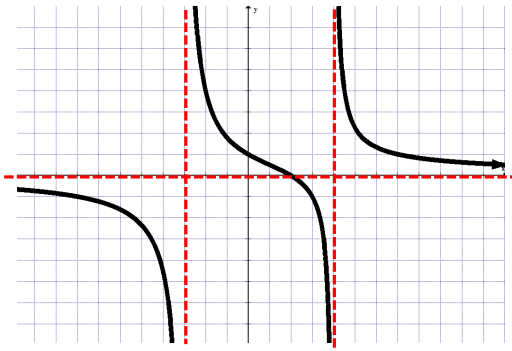
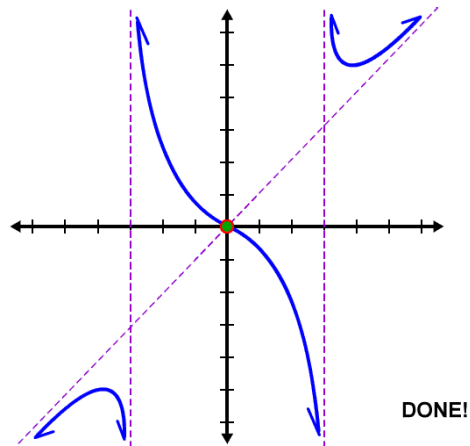$$f(x) = \frac{2x^2 + 7x + 5}{x+1}$$

How do you find asymptotes?

$$y = \frac{1}{x}$$

$$y = \frac{2x^2 + 10}{x^2 - 25}$$

DONE!

$$y = \frac{6x - 12}{x^2 - x - 12}$$

$$y = \frac{x^3}{x^2 - 9}$$

DONE!

Asymptotes

vertical asymptotes:

Set the factors of the denominator = 0, then solve for x

horizontal asymptotes: think of end behavior

Think about large values of x, what line do the answers approach?

Compare the degree & leading coefficient of the numerator and denominator:

$$f(x) = \frac{nx^a \cdots}{mx^b \cdots}$$

a) $a < b$, $y = 0$

b) $a = b$, $y = n/m$ (ratio of leading coefficients)

c) $a > b$, $y =$ higher degree polynomial

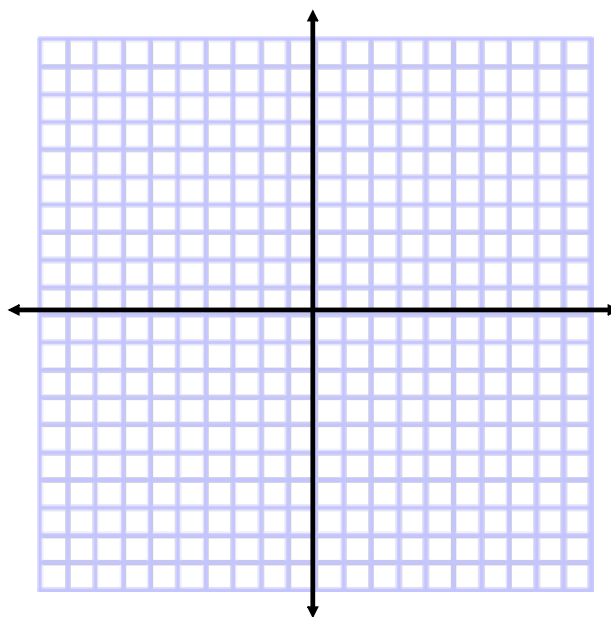Graph each equation and answer the following information as it applies.

Domain

Holes

VA

HA

x-int

y-int

$$y = \frac{3x+1}{x^2+3x+2}$$

Graph each equation and answer the following information as it applies.

Domain

Holes

VA

HA

x-int

y-int

$$y = \frac{x^2 - 25}{x^2 - 4x - 5}$$

Graph each equation and answer the following information as it applies.

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

Domain

Holes

VA

HA

x-int

y-int

Graph each equation and answer the following information as it applies.
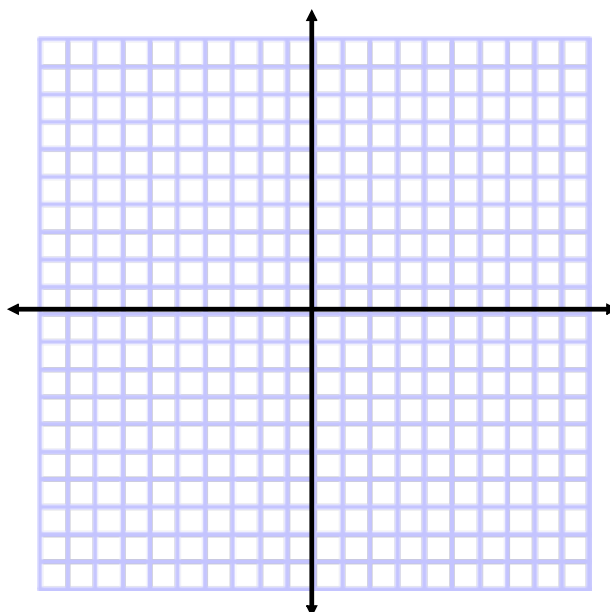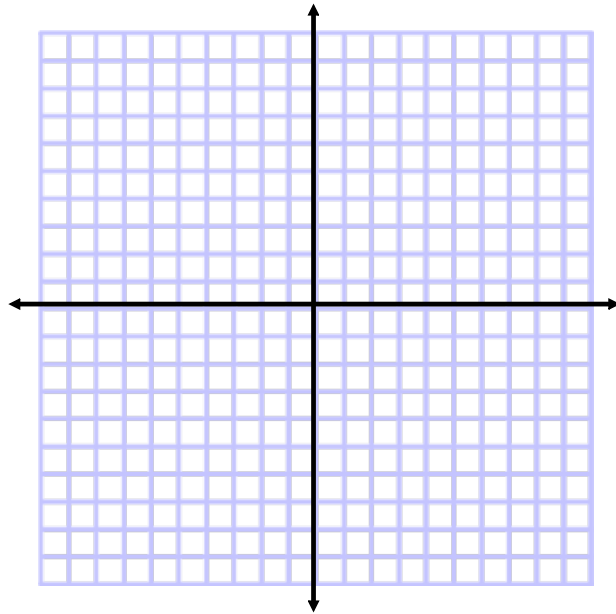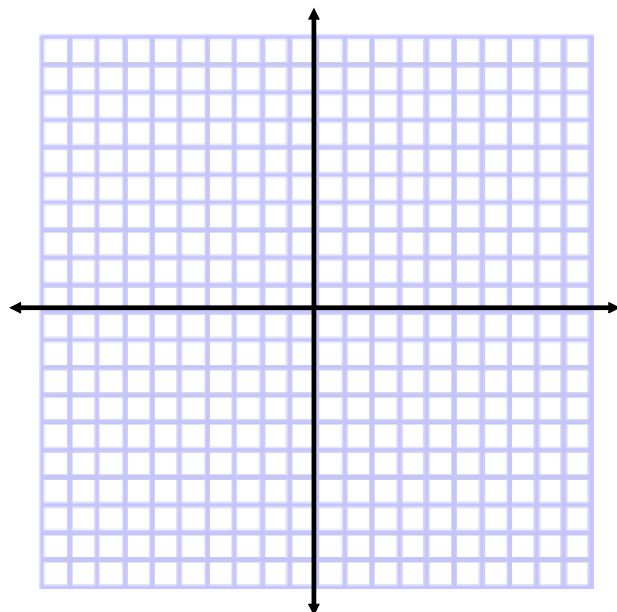
$$y = \frac{3x^2 - 12x}{x^2 - 2x - 3}$$

Domain

Holes

VA

HA

x-int

y-int

Worksheet 2.6 A