What you will learn about:
Graphing Rational Functions

Find the x-intercept(s) and y-intercept of each function.

A) $f(x) = x^2 - 36$

B) $f(x) = \frac{x-5}{x+3}$

C) $f(x) = \frac{x}{x+6}$

D) $\frac{x^2+4}{x+2}$

E) $f(x) = \frac{x^2-3x-10}{x}$

Find the domain of the function algebraically. Support your answer graphically

A) $f(x) = x^2 - 9$

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

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

D) $f(x) = \frac{3}{x} + \frac{7}{x-1}$

E) $f(x) = \frac{x+6}{x^2-36}$

Determine the range of the function

A) $f(x) = 4 + x^2$

B) $f(x) = 2 + \sqrt{9 - x}$

C) $f(x) = \dfrac{x^2}{4 - x^2}$

D) $f(x) = \dfrac{3 - 2x^2}{4 + x^2}$

Graph the function and tell whether or not the function has a point of discontinuity at x = 0. If there is a discontinuity, tell whether the discontinuity is removable (Hole) or non-removeable (Vertical Asymptote).

A) $f(x) = \dfrac{5}{x}$

B) $f(x) = \dfrac{x^2 + x}{x}$

C) $f(x) = \dfrac{|5x|}{x}$

D) $f(x) = \dfrac{2x}{x - 4}$

Reminder:
Sometimes a value of x that seems to be a vertical asymptote is actually a hole

Find all horizontal and vertical asymptotes

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

B) $f(x)=2^x$

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

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

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

F) $f(x)=\frac{x+5}{x^3-27}$

Determine if each function is continuous. If the function is not continuous, find the x-axis location of each discontinuity and classify each discontinuity as infinite or removable. Also find any horizontal asymptotes.

A) $f(x)=\frac{3x^2+15x}{x+5}$

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

C) $f(x)=\frac{9x+6}{x^2-4}$

D) $f(x)=\frac{9x+18}{x^2-4}$

E) $f(x)=\frac{x-5}{x^2-4x-5}$

Identify each point of discontinuity, holes, vertical asymptote, horizontal asymptote, zero(s), y-intercept, domain, and range.

$f(x) = \frac{x-4}{-4x-16}$

Zeros:

y-intercepts:

Points of Discontinuity:

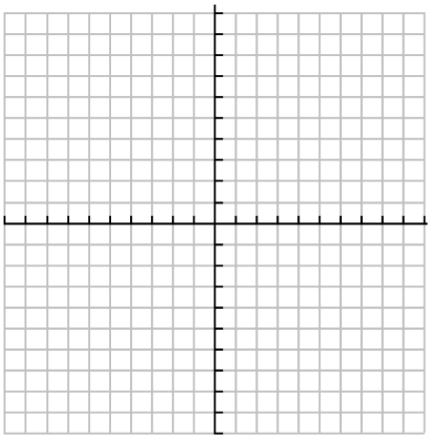
Hole:

Vertical Asymptote:

Horizontal Asymptote:

Domain:

Range:



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

Zeros:

y-intercepts:

Points of Discontinuity:

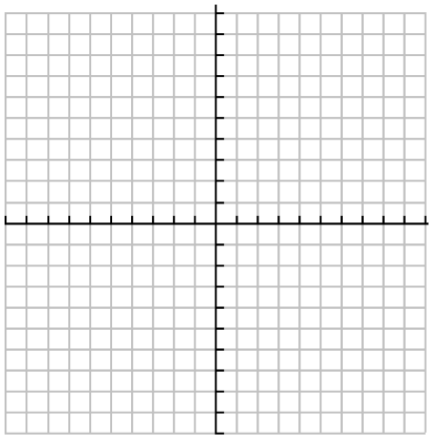
Hole:

Vertical Asymptote:

Horizontal Asymptote:

Domain:

Range:



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

Zeros:

y-intercepts:

Points of Discontinuity:

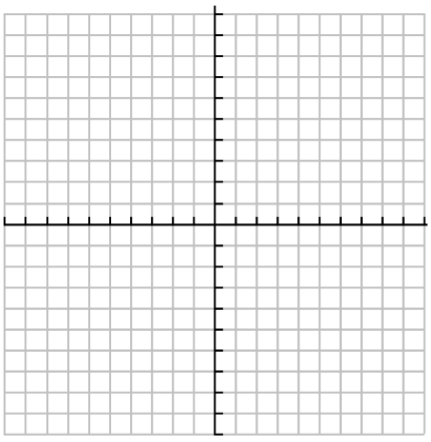
Hole:

Vertical Asymptote:

Horizontal Asymptote:

Domain:

Range:



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

Zeros:

y-intercepts:

Points of Discontinuity:

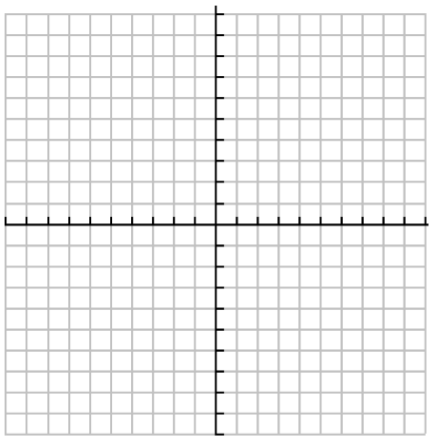
Hole:

Vertical Asymptote:

Horizontal Asymptote:

Domain:

Range:



$f(x) = \frac{x^3-16x}{-4x^2+4x+24}$

Zeros:

y-intercepts:

Points of Discontinuity:

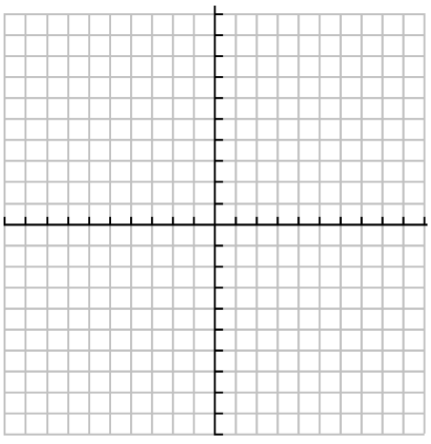
Hole:

Vertical Asymptote:

Horizontal Asymptote:

Domain:

Range:



$f(x) = \frac{2x^2+10x+12}{x^2+3x+2}$

Zeros:

y-intercepts:

Points of Discontinuity:

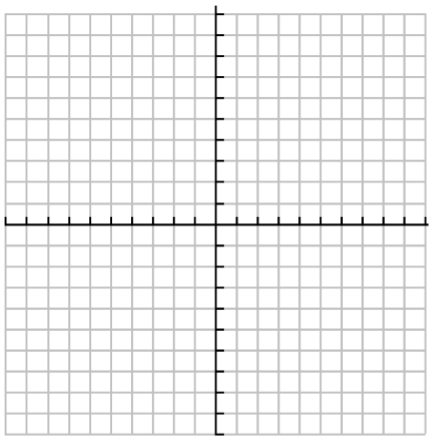
Hole:

Vertical Asymptote:

Horizontal Asymptote:

Domain:

Range:



	$f(x) = \frac{x^2-4}{x^2-9}$	$f(x) = \frac{x^2-x-6}{x^2-2x-8}$
	Zeros:	Zeros:
	y-intercepts:	y-intercepts:
	Points of Discontinuity:	Points of Discontinuity:
	Hole:	Hole:
	Vertical Asymptote:	Vertical Asymptote:
	Horizontal Asymptote:	Horizontal Asymptote:
	Domain:	Domain:
	Range:	Range: