

Trig 3.7

Quiz 3.5-3.6

Graph rational functions

Determine horizontal, vertical, slant asymptotes

rational function $y=1/x$

vertical asymptote

$$x = -$$

horizontal asymptote

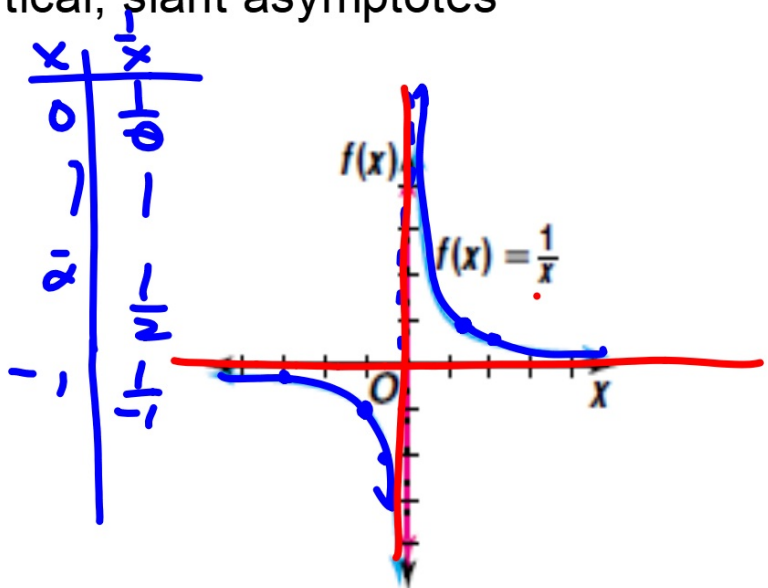
$$y =$$

point discontinuity

slant asymptote

$$y = mx + b$$

common factor



higher in denom $y=0$
 Determine the equations of the vertical and horizontal asymptotes, if any, of each function.

5. $f(x) = \frac{2x}{x-5}$

tie $y = \text{ratio}$
 higher in numer.

$$x-5=0$$

VA $x=5$ $x=5$

HA $y=1$

$$\frac{2x}{x} \cdot \frac{1x}{1x} = 1$$

6. $g(x) = \frac{x^3}{(x-2)(x+1)}$

$$x+1=0$$

$$x-2=0$$

VA $x=2$

$$x=-1$$

HA

horizontal: **degrees**

if denom is higher:

if it's a tie:

if denom is lower:

14-23 all

There are times when the numerator and denominator of a rational function share a common factor. Consider $f(x) = \frac{(x+2)(x+3)}{x-3}$. Since an x -value of 3 results in a denominator of 0, you might expect there to be a vertical asymptote at $x = 3$. However, $x - 3$ is a common factor of the numerator and denominator.

yes
VA
HA

$$x - 3 = 0$$
$$x = 3$$

—

not yet

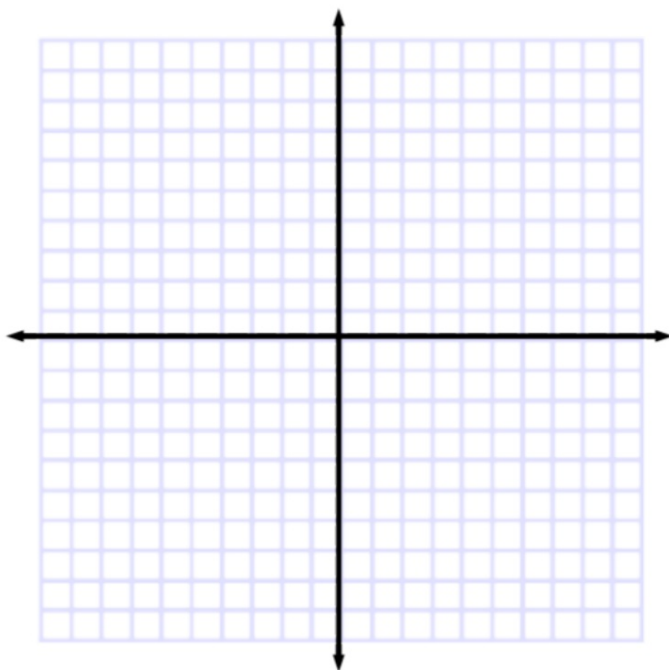
$$\frac{x-3}{(x+2)(x-3)}$$

pt. discount.
sl. asymptote

Common factor: point discontinuity

Graph each function.

35. $y = \frac{(x - 2)(x + 1)}{x}$



Determine:

common factors (holes)

VA

HA*

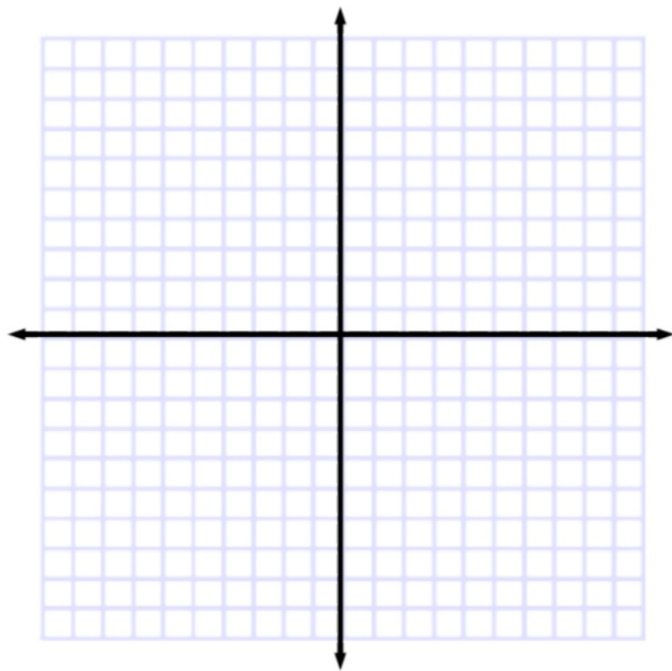
SA*

crossing point(s)

Test point(s)

* Can have one or the other,
but not both

12. $y = \frac{x^2 + 4x + 4}{x + 2}$



Determine:
common factors

VA

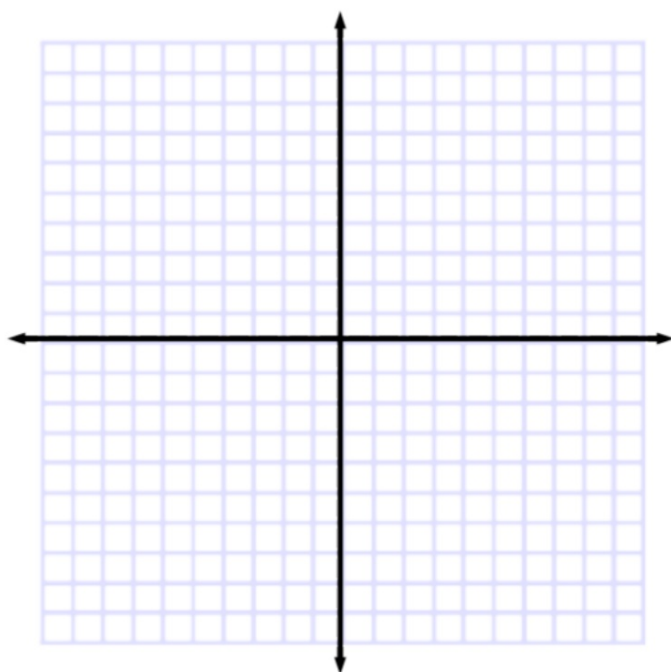
HA

crossing point(s)

SA

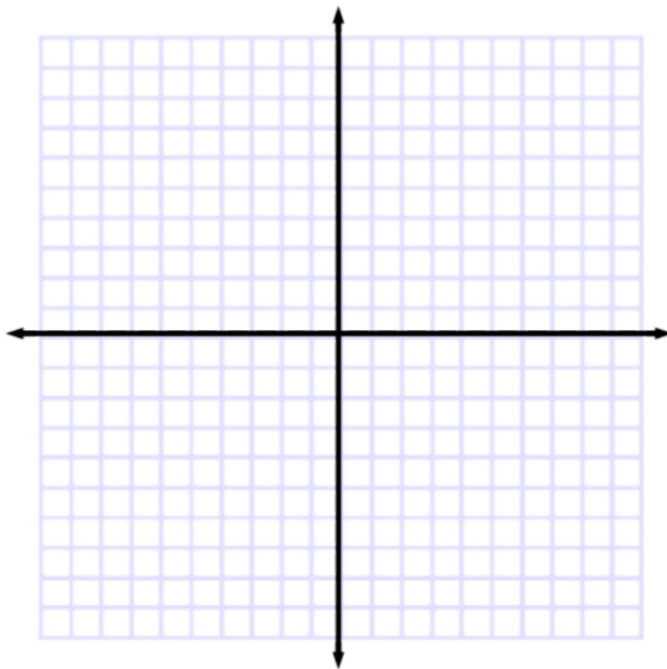
Test point(s)

36. $y = \frac{x^2 - 4}{x - 2}$



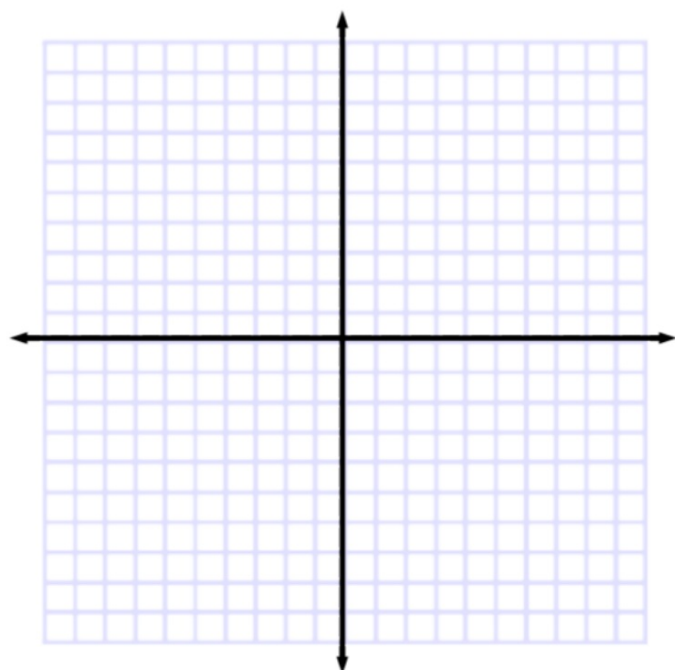
Determine:
common factors
VA
HA
crossing point(s)
SA
Test point(s)

39. $y = \frac{x^2 - 6x + 9}{x^2 - x - 6}$



Determine:
 common factors
 VA
 HA
 crossing point(s)
 SA
 Test point(s)

5 Graph $y = \frac{(x + 3)(x + 1)}{x(x + 3)(x - 2)}$.



Determine:
common factors
VA
HA
crossing point(s)
SA
Test point(s)