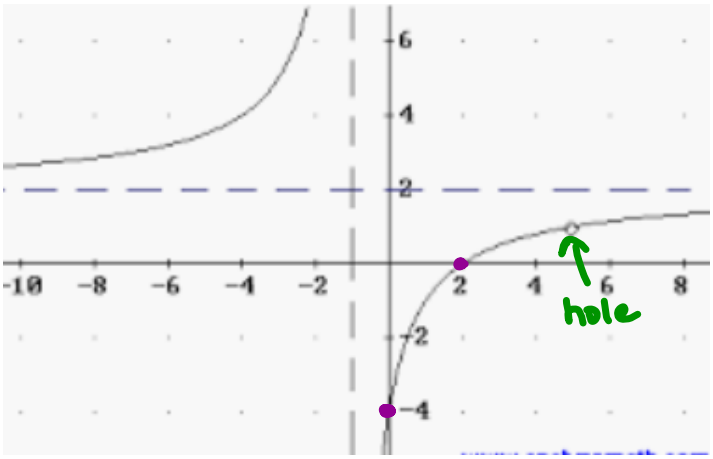
Vertical Asymptote $x=1$

Horizontal Asymptote $y=2$

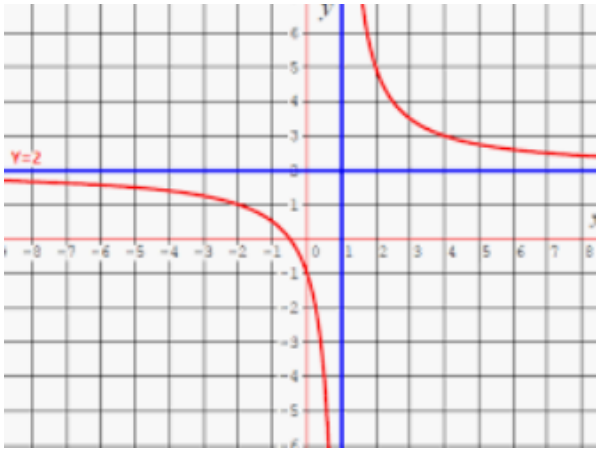
X-int $(-0.5,0)$ Y-int $(0,-1)$

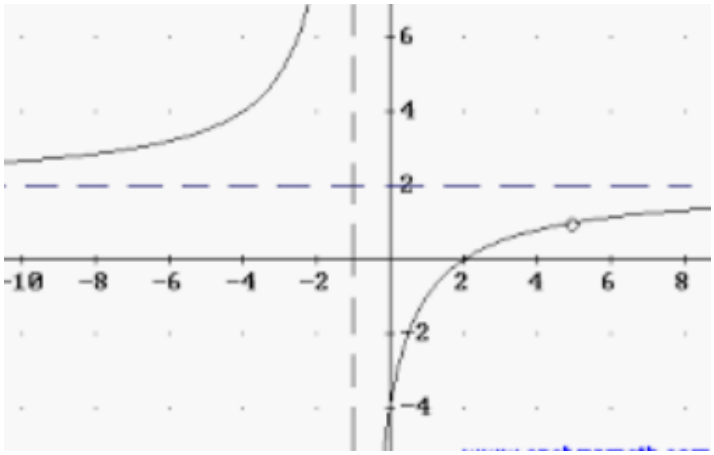


Vertical Asymptote $x=-1$

Horizontal Asymptote $y=2$

X-int $(2,0)$ Y-int $(0,-4)$


y
Y=2


6
4
2
-10
-8
-6
-4
-2
2
4
6
8
-2
-4

Notes #1 Continued...

Asymptotes

↕ Vertical $x = \#$

excluded values

denominator – bottom

↔ horizontal $y = \#$

compare the exponents

Horizontal

compare the exponents from the original problem

- top exponent is bigger — NO HORIZONTAL ASYMP.
- bottom exponent is bigger — $y = 0$ (x-axis)
- same exponent — $y = \frac{\text{lead coefficient}}{\text{lead coefficient}}$ fraction

NO / $y = 0$ = fra

Find the horizontal asymptote:

① $\frac{x^3}{x^2 - 10}$ top — none

② $\frac{x}{x^2 + 2x}$ bottom — $y = 0$

③ $\frac{1}{x + 1}$ bottom — $y = 0$

④ $\frac{x^2 + 5}{2x - 3}$ top — none

⑤ $\frac{2x + 1}{3x + 8}$ $y = \frac{2}{3}$

⑥ $\frac{1x^2 - 1}{1x^2 - 9}$ $y = 1$

Intercepts

X-intercepts come from the **TOP** of the fraction. SOLVE

(#, 0)

① $\frac{x+3}{x^2-4} = 0$

(-3, 0)

② $\frac{5}{x+1} = 0$?

no x-int (b/c no x)

③ $\frac{2x}{x-5} = 0$

(0, 0)

Y-intercept plug in **zero** for ALL Xs and simplify

(0, #)

① $\frac{3x-4}{x-2}$

$\frac{3(0)-4}{0-2} = \frac{-4}{-2}$

(0, 2)

② $\frac{6}{x+3}$

$\frac{6}{0+3}$

(0, 2)

③ $\frac{2x}{x+1}$

$\frac{2(0)}{0+1} = \frac{0}{1}$

(0, 0)

Let's put it together...

Top - X-intercept (#,0)

Bottom - Vertical asymptote X=#

Compare exponents - Horizontal asymptote

no / y=0 = fra

Plug in zero for x - y-intercept (0,#)

① $\frac{5x+5}{x+2}$

vert. asymp $x=-2$

horiz. asymp $y=5$

$5x+5=0$, $-5\ -5$, $\frac{5x}{5}=\frac{-5}{5}$ X-int $(-1,0)$

$\frac{5(0)+5}{0+2}$ y-int $(0,5/2)$

② $\frac{3x}{x^2-25}$

$(x+5)(x-5)$

vert. asymp $x=-5$ $x=5$

horiz asymp $y=0$

$\frac{3x}{3}=\frac{0}{3}$ X-int $(0,0)$

$\frac{3(0)}{0^2-25}$ y-int $(0,0)$