GUIDED NOTES: Graphs of Rational Functions

For each rational function, determine:
1) vertical asymptotes (factors that DO NOT cancel)
2) holes (factors that DO cancel)
3) domain (what values of x are excluded)
4) horizontal asymptotes (compare degrees of the numerator and denominator)
5) graph!!

Draw

step 1: VA + HA

step 2: curve (from calc.)

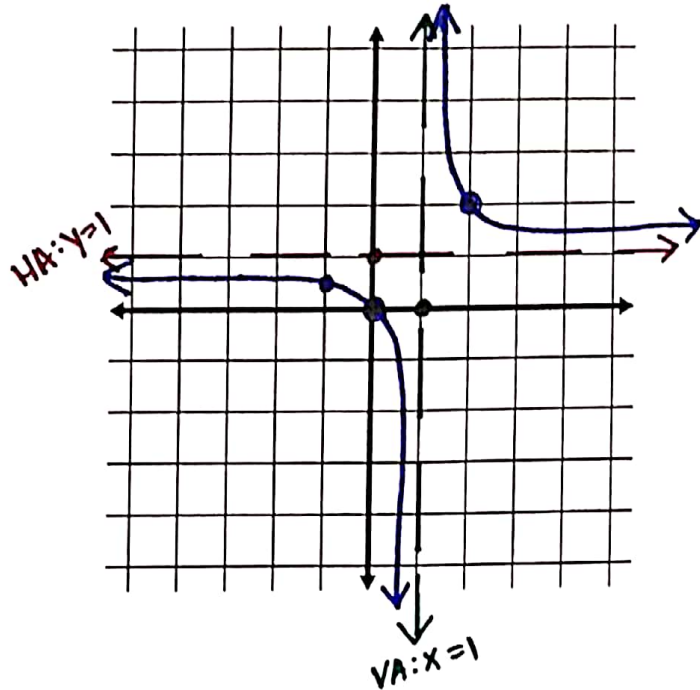step 3: holes

EX1: $f(x) = \frac{x}{x-1}$

holes: none

$$x - 1 = 0$$
$$+1 \quad +1$$
$$VA: X = 1$$

domain: $X \neq 1$

highest: x

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

$$HA: y = 1$$

HA: Y=1

VA: X = 1

EX2: $f(x) = \frac{6}{(x-3)(x+4)} \Rightarrow 6$

$(x)' \cdot (x)' \Rightarrow (x^2)$

holes: none

$$x - 3 = 0$$
$$+3 \quad +3$$
$$VA: X = 3$$

$$x + 4 = 0$$
$$-4 \quad -4$$
$$VA: X = -4$$

domain: $X \neq 3, -4$

highest: x^2

$$y = \frac{0x^2}{1x^2}$$

$$HA: y = 0$$

HA: Y=0

VA: X = -4
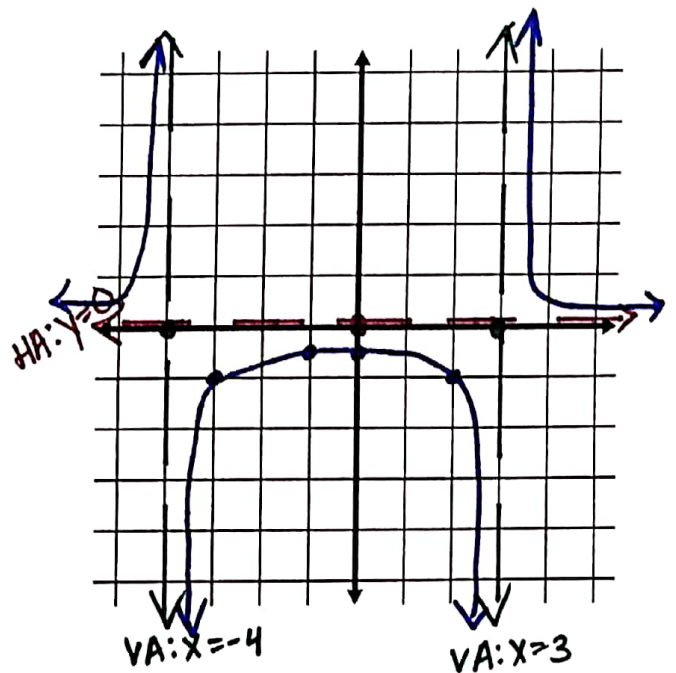
VA: X = 3

EX3: $f(x) = \dfrac{x^2+x-2}{x^2+5x+6} \Rightarrow$ factor! $= \dfrac{(x+2)(x-1)}{(x+2)(x+3)}$

$x+2=0$
$-2 \quad -2$
hole: $x=-2$

$x+3=0$
$-3 \quad -3$
VA: $x=-3$

domain: $x \neq -2, -3$

highest: x^2

$y = \dfrac{1x^2}{1x^2}$

HA: $y=1$

HA: $y=1$

hole: $x=-2$

VA: $x=-3$
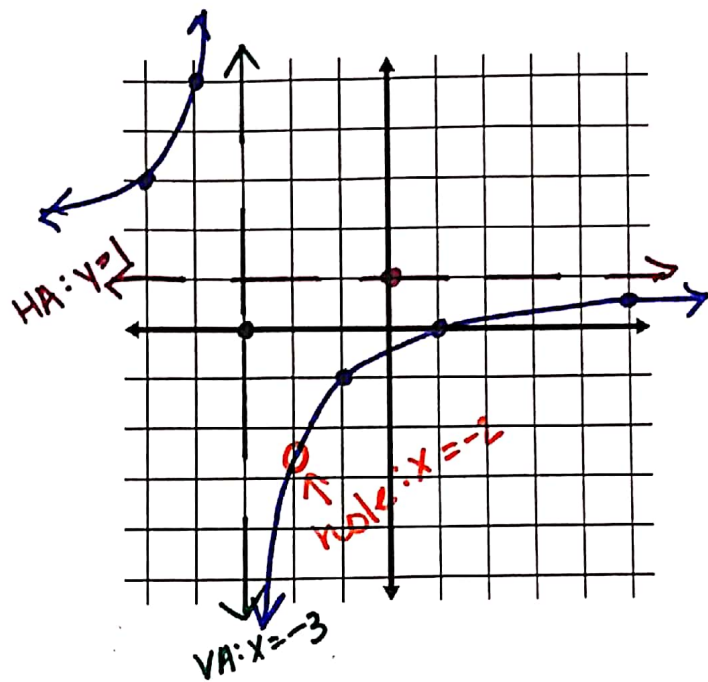
EX4: $f(x) = \dfrac{x^2-4}{x-2} \Rightarrow$ factor! $= \dfrac{(x+2)(x-2)}{(x-2)}$

$x-2=0$
$+2 \quad +2$
hole: $x=2$

VA: none

domain: $x \neq 2$

highest: x^2

$y = \dfrac{1x^2}{0x^2}$

HA: DNE

hole: $x=2$