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!!

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

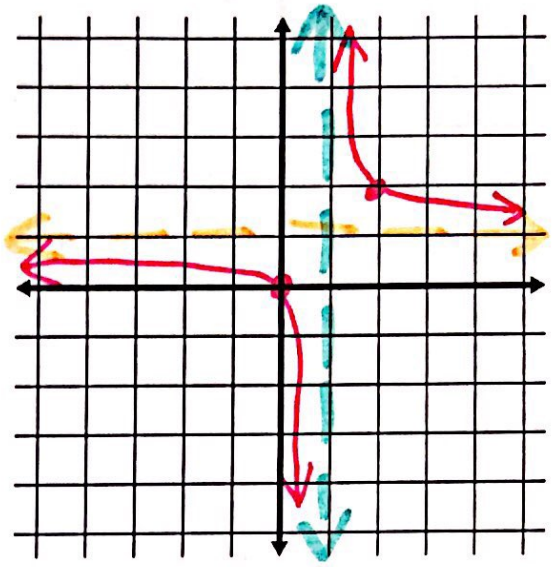
VA: $x-1=0$
$x=1$

hole: none

Domain: $x \neq 1$

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

$y=1$



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

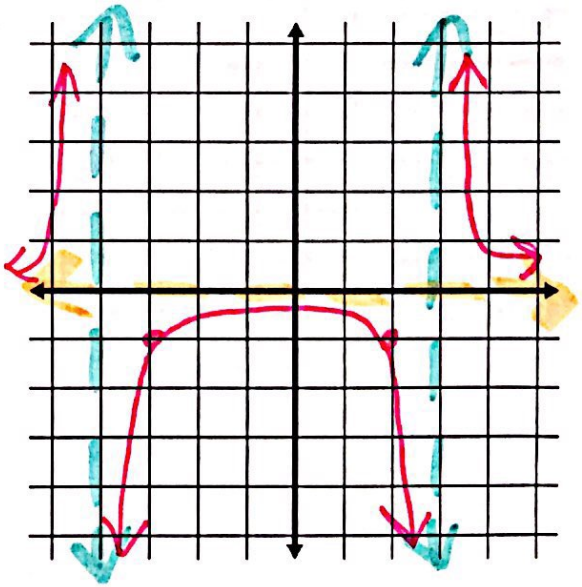
hole: none

VA: $x-3=0$ $\quad x+4=0$
$x=3$ $\quad x=-4$

Domain: $x \neq 3, -4$

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

$\boxed{y=0}$



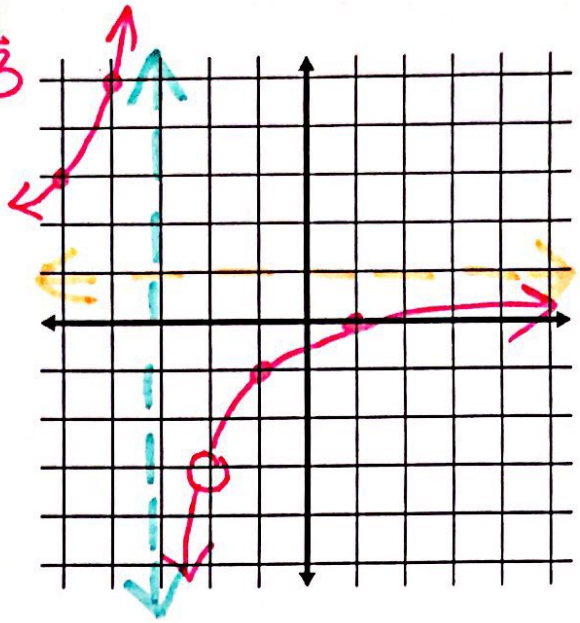
EX3: $f(x) = \frac{x^2+x-2}{x^2+5x+6} = \frac{(x+2)(x-1)}{(x+2)(x+3)} = \frac{x-1}{x+3}$

hole: $x+2=0$

$x=-2$

$y = \frac{-2-1}{-2+3} = \frac{-3}{1}$

$(-2,-3)$



VA: $x+3=0$

$x=-3$

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

HA: $y = \frac{x^2}{x^2}$

$y=1$

EX4: $f(x) = \frac{x^2-4}{x-2}$

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

VA = none

hole: $x=2$ $\quad y=2+2=4$ $\quad (2,4)$

Domain: $x \neq 2$

HA: $y = \frac{x^2}{0x^2}$ none