Section 1.2
(DAY 2)

Vertical Asymptotes: can be found by setting unique factors In denominator = 0

At vertical asymptotes, function outputs increase or decrease without bound

Horizontal Asymptotes: look at the graph on GC and trace out to very small and very large values of x (end behavior) to see if the outputs approach a value. OR know the rules:

- **If Degree of Numerator = Degree of Denominator, then the HA is y=ratio of leading coefficients**
- **If Degree of Numerator< Degree of Denominator, then the HA is y=0**
- **If Degree of Numerator > Degree of Denominator, then there is NO HA (there may be a slant asymptote)**

Ex 3) Find all horizontal and vertical asymptotes for each function.

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

$\dfrac{x}{(x-2)(x+2)}$

V.A. $x=2$ $x=-2$

H.A. deg of N < deg of D

$y=0$

As $x \to \mp\infty$ $f(x)=0$

b) $g(x)=\dfrac{3x-1}{x+3}$

V.A. $x=-3$

H.A. deg of N = deg of D

$y=3$

As $x \to \mp\infty$ $f(x)=3$

c) $h(x)=\dfrac{x+2}{3-x}$ = $\dfrac{x+2}{-x+3}$

V.A. $x=3$

H.A. $y=-1$

d) $p(x)=\dfrac{x}{x-1}$

V.A. $x=1$

H.A. $y=1$

* verify looking at the graphs.