HORIZONTAL ASYMPTOTES

CASE 1: DEGREE OF TOP IS LARGER
HA: NONE

CASE 2: DEGREE OF BOTTOM IS LARGER
HA: $y=0$

CASE 3: DEGREES ARE SAME

ex: $f(x)=\frac{5x^3-7x+2}{3+8x^3}$

HA: $y=\frac{5}{8}$

ex: $f(x)=\frac{3}{x-2}$

HA: $y=0$

ex: $f(x)=\frac{x^2-1}{x-7}$

HA: NONE

1. $f(x)=3+\frac{x^2}{x^3+1}$

$=\frac{3(x^3+1)+x^2}{x^3+1}$

$=\frac{3x^3+3+x^2}{x^3+1}$

HA: $y=\frac{3}{1}$

$y=3$

2. $f(x)=\frac{5x^3-7x+2}{4x^3+1}$

HA: $y=\frac{5}{4}$

3. $f(x)=\frac{3x^2}{x+2}$

x	10^0	10^1	10^2	10^3	10^4	10^5	10^6
$f(x)$	$\frac{3(1)^2}{1+2}=1$	$\frac{3(10)^2}{10+2}=25$	$\frac{3(100)^2}{100+2}=294.12$	$\frac{3(1000)^2}{1000+2}=2994.01$	$\frac{3(10000)^2}{10000+2}=29994.00$	$\frac{3(100000)^2}{100000+2}=299994.00$	$\frac{3(1000000)^2}{1000000+2}=2999994$

$\lim_{x\to\infty}\frac{3x^2}{x+2}=\infty$