

## 2.2 Limits Involving Infinity

\* Limits @ Infinity - end behavior of a graph / function

ex:  $\lim_{x \rightarrow \infty} \frac{5}{x} = 0$

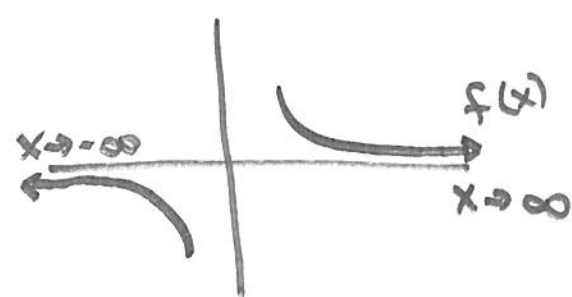
as  $x \rightarrow \infty$ ,  
graph of  $\frac{5}{x} \rightarrow 0$   
from positive #'s

*(Thought bubble:  $\frac{5}{1000} = .005$ )*

ex:  $\lim_{x \rightarrow -\infty} \frac{5}{x} = 0$

as  $x \rightarrow -\infty$ ,  
graph of  $\frac{5}{x} \rightarrow 0$   
from negative #'s

*(Thought bubble:  $\frac{5}{-1000} = -.005$ )*



ex:  $\lim_{x \rightarrow \infty} \frac{2x+5}{3x-4}$

$= \lim_{x \rightarrow \infty} \frac{x(2 + \frac{5}{x})}{x(3 - \frac{4}{x})}$

$= \lim_{x \rightarrow \infty} \frac{2 + \frac{5}{x} \rightarrow 0}{3 - \frac{4}{x} \rightarrow 0}$

$= \frac{2}{3}$

*(Thought bubble:  $\frac{2(1000)+5}{3(1000)-4} = \frac{2005}{2996} \approx \frac{8}{8}$ )*

*(Thought bubble:  $x(\frac{5}{x}) = 5$ )*

*(Thought bubble:  $\frac{5}{1000} = .005 \rightarrow 0$   
 $\frac{4}{1000} = .004 \rightarrow 0$ )*

# PreCalc Shortcuts

H.A (or  $\lim_{x \rightarrow \pm\infty} f(x)$ )

highest  
exp N = highest  
exp D

Look @ leading  
coefficients  
(H.A.  $y = \#$ )

exp N < exp D

zero  
(H.A.  $y = 0$ )

exp N > exp D

$\neq \infty$   
(no H.A.)