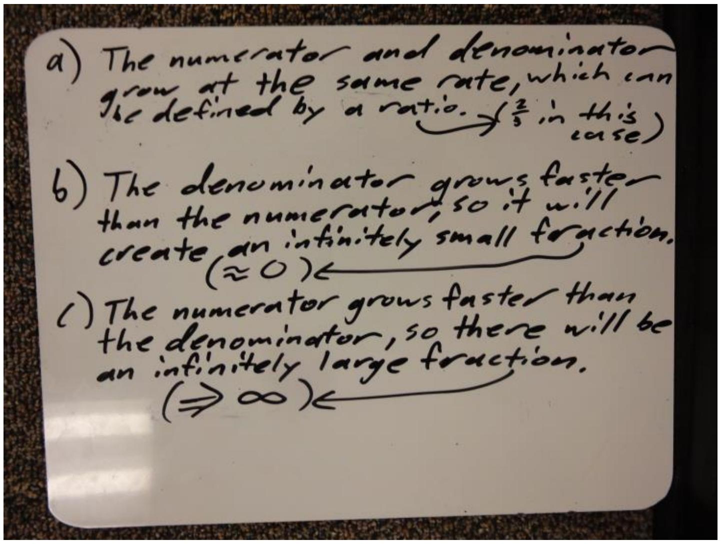
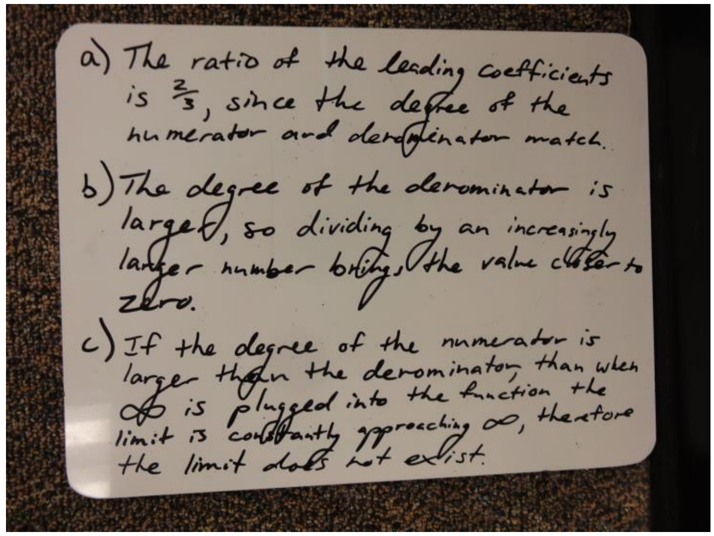
Limits At Infinity

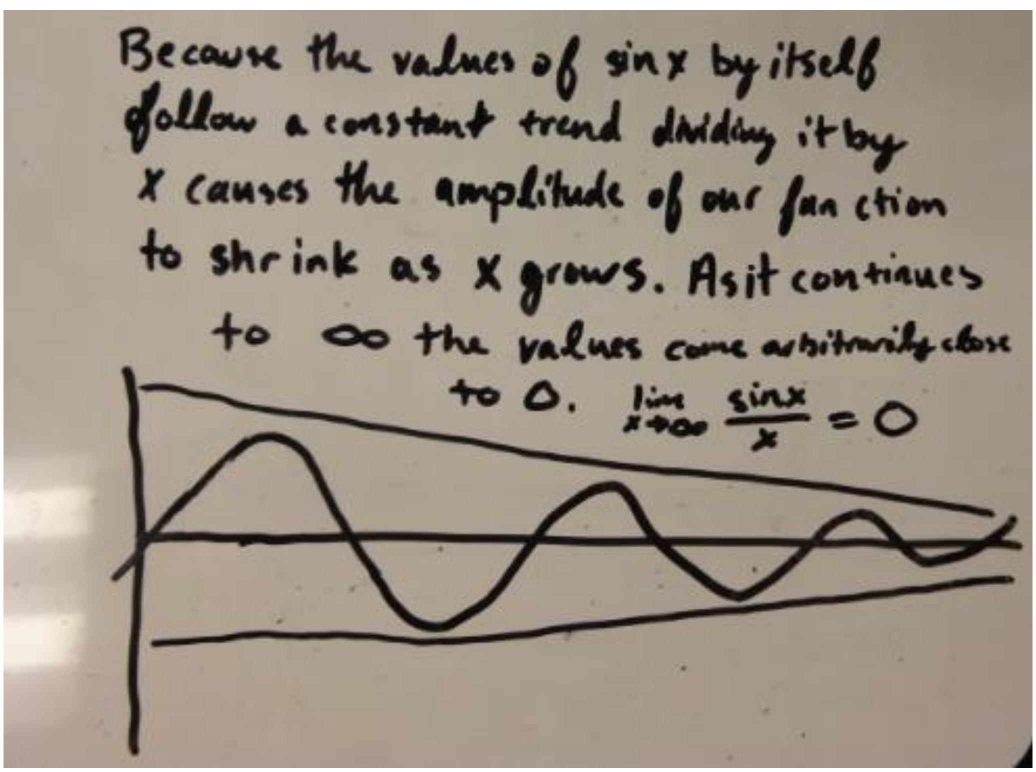
Informal descriptions of limits at infinity, based on the degrees of the numerator and denominator:



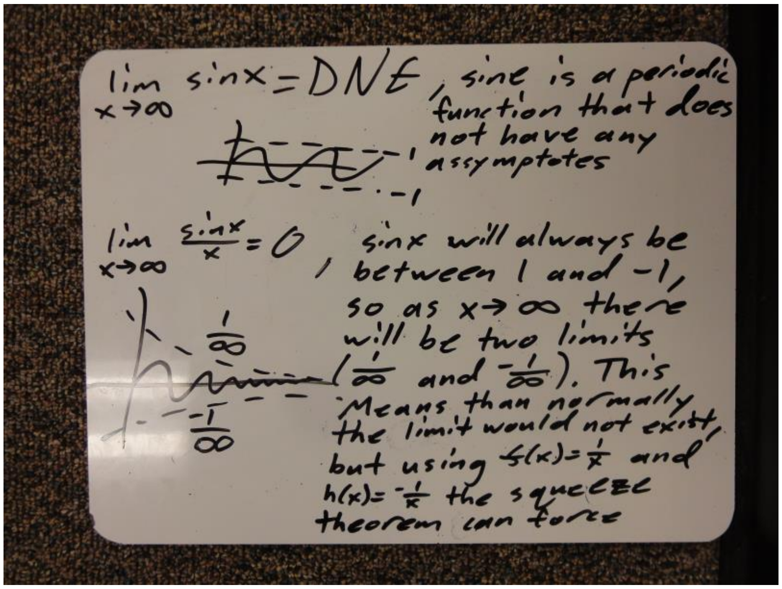


Figuring out $\lim\limits_{x\to\infty} \frac{\sin x}{x}$ (maybe looking at $\lim\limits_{x\to\infty} \sin x$ as a warm up).

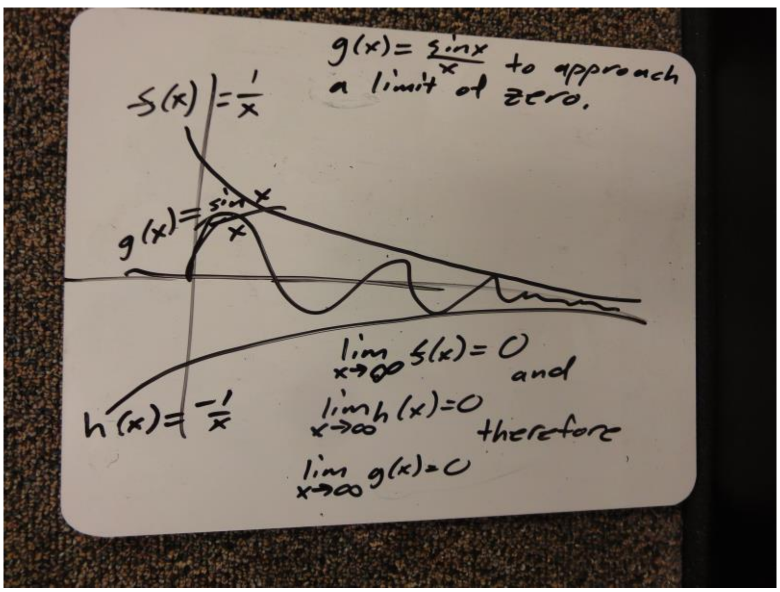
A REALLY good explanation for why $\lim\limits_{x\to\infty} \frac{\sin x}{x} = 0$:



This board demonstrates (informally) the squeeze theorem:



Same Idea:



The formal math may look like something like this: We know $-1 \le \sin x \le 1$ for all values of x. Since $x \to \infty$, we can assume that $x > 0$ so we can divide through by x without affecting the inequality; this gives $-\frac{1}{x} \le \frac{\sin x}{x} \le \frac{1}{x}$. At this point, let $x \to \infty$ and we find that $\pm\frac{1}{x} \to 0$. Therefore, $\lim_{x\to\infty} \frac{\sin x}{x} = 0$ since $y = \frac{\sin x}{x}$ is squeezed between $-\frac{1}{x}$ and $\frac{1}{x}$, both of which travel to zero.