- **Reminder:** Problem Set 2 is available on the course website, and is due Thursday, 10 October by 11:59pm.
- Today's lecture will assume you have watched videos 2.19 2.20 For Tuesday's lecture, watch videos 2.21 - 2.22.

• If f(x) > g(x) on an interval centered at *a* but maybe not *a*, then $\lim_{x \to a} f(x) > \lim_{x \to a} g(x)$ (assuming the limits exist).

•
$$\lim_{x \to 0} f(x) = 0$$
 iff $\lim_{x \to 0} f(f(x)) = 0$

• If g is a non-zero function that is bounded on \mathbb{R} , then $\lim_{x \to 0} \frac{g(x)}{x^2} = \infty$

• If g is a function satisfying |g(x)|>1 on \mathbb{R} , then $\lim_{x \to 0} \frac{g(x)}{x^2} = \infty$

• If
$$\lim_{x\to 0} \frac{g(x)}{x}$$
 exists, then $\lim_{x\to 0} g(x) = 0$

Using that $\lim_{x\to 0} \frac{\sin x}{x} = 1$ (and maybe some simple trig identities), compute the following limits:



Compute the following limits.

$$\lim_{x \to \infty} (x^7 - 2x^5 + 11)$$

$$\lim_{x \to \infty} \left(x^2 - \sqrt{x^5 + 1} \right)$$

$$\lim_{x \to \infty} \frac{x^2 + 11}{x + 1}$$

$$\lim_{x \to \infty} \frac{x^2 + 2x + 3}{3x^2 + 4x + 5}$$

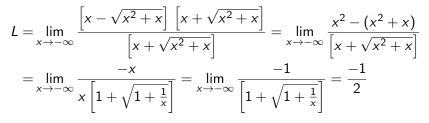
$$\lim_{x \to \infty} \frac{x^2 + 2x + 3}{3x^2 + 4x + 5}$$

repeat all of them when ∞ is replaced by $-\infty$

Which solution is correct?

Compute
$$L = \lim_{x \to -\infty} \left[x - \sqrt{x^2 + x} \right].$$

• Solution 1



Solution 2

$$L = \lim_{x \to -\infty} \left[x - \sqrt{x^2 + x} \right] = (-\infty) - \infty = -\infty$$