

Source: [\[\[KBMATH401ComputingLimits\]\]](#)

## 1 | Limit Laws

Here 'em:

**Limit Laws** Suppose that  $c$  is a constant and the limits

$$\lim_{x \rightarrow a} f(x) \quad \text{and} \quad \lim_{x \rightarrow a} g(x)$$

exist. Then

$$1. \lim_{x \rightarrow a} [f(x) + g(x)] = \lim_{x \rightarrow a} f(x) + \lim_{x \rightarrow a} g(x)$$

$$2. \lim_{x \rightarrow a} [f(x) - g(x)] = \lim_{x \rightarrow a} f(x) - \lim_{x \rightarrow a} g(x)$$

$$3. \lim_{x \rightarrow a} [cf(x)] = c \lim_{x \rightarrow a} f(x)$$

$$4. \lim_{x \rightarrow a} [f(x)g(x)] = \lim_{x \rightarrow a} f(x) \cdot \lim_{x \rightarrow a} g(x)$$

$$5. \lim_{x \rightarrow a} \frac{f(x)}{g(x)} = \frac{\lim_{x \rightarrow a} f(x)}{\lim_{x \rightarrow a} g(x)} \quad \text{if } \lim_{x \rightarrow a} g(x) \neq 0$$

$$6. \lim_{x \rightarrow a} f(g(x)) = f\left(\lim_{x \rightarrow a} g(x)\right)$$

$$7. \lim_{x \rightarrow a} f(x)^n = \left(\lim_{x \rightarrow a} f(x)\right)^n$$

Figure 1: Screen Shot 2020-09-02 at 1.55.13 PM.png

## 1.1 | Trig Limits + Squeeze Theorem!

**3 The Squeeze Theorem** If  $f(x) \leq g(x) \leq h(x)$  when  $x$  is near  $a$  (except possibly at  $a$ ) and

$$\lim_{x \rightarrow a} f(x) = \lim_{x \rightarrow a} h(x) = L$$

then

$$\lim_{x \rightarrow a} g(x) = L$$

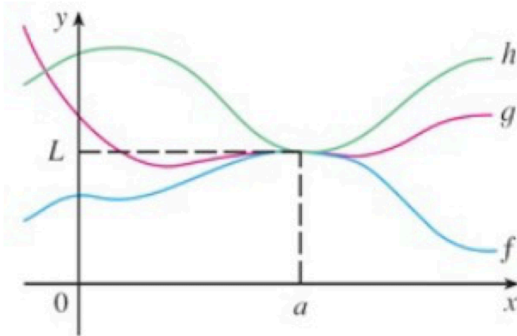


Figure 2: Screen Shot 2020-09-11 at 1.20.05 PM.png

Very logical theorem — if two things “enveloping functions” approach the same value, and the function in the middle will approach the same value

#disorganized

- Dampening oscillation
- Could be modeled with  $\frac{\sin x}{x}$