Do now as a warm-up:

I'm thinking of a function.
Let's call it f(x).
Suppose I only look at x values from -0.5 to 0.5.
For those x values, f(x) is at least as big as 1-|x|
and is no bigger than 1/(cosx).
What does f(x) do near 0?

1.3 Evaluating Limits Analytically

GNAW on this:

$$\lim_{x \to 1} \frac{x^3-1}{x-1}$$

ex. Evaluate analytically: $\lim_{x \to 0} \frac{\sqrt{x+4}-2}{x}$

ex. Evaluate analytically: $\lim_{x \to 3} \frac{x - 3}{\sqrt{3} - \sqrt{x}}$

ex. Evaluate analytically: $\lim_{x \to 3} |x - 3|$

Re-write the function as a piecewise defined function.

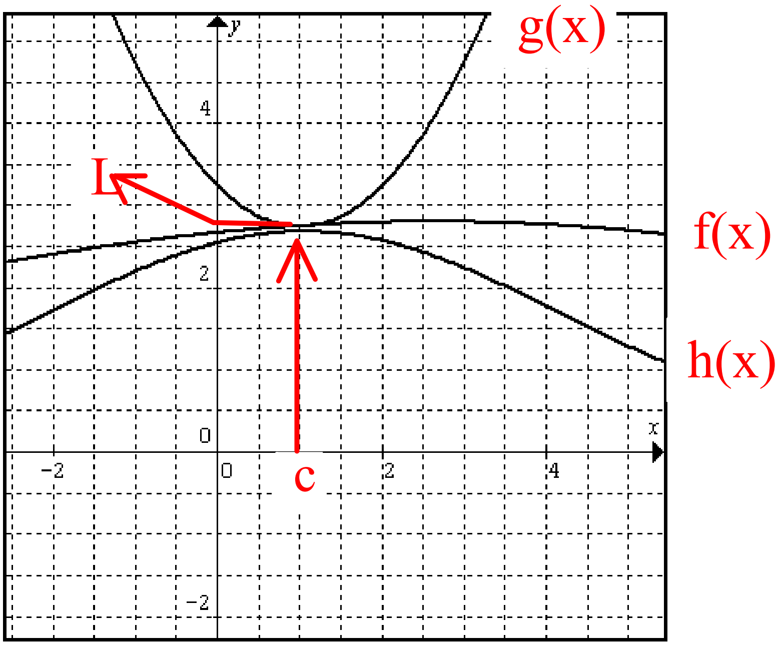
ex. Evaluate analytically: $\lim_{x \to 3} \frac{x^2 - 5x + 6}{x - 3}$

ex. Evaluate analytically: $\lim_{x \to -1} \frac{x^2 - 1}{(x+1)^2}$

ex. Evaluate analytically: $\lim_{x \to 2} \frac{x - \sqrt{6 - x}}{(x - 2)}$

Thm. Squeeze Theorem:

If $h(x) \leq f(x) \leq g(x)$ $\forall x \in$ an open interval containing c, except possibly at c, and if $\lim_{x \to c} h(x) = L = \lim_{x \to c} g(x)$ then $\lim_{x \to c} f(x)$ exists and is L.



Thm. $\lim_{x \to 0} \frac{\sin x}{x} = 1$ and $\lim_{x \to 0} \frac{1 - \cos x}{x} = 0$

ex. Evaluate analytically: $\lim_{x \to 0} \frac{\sin 5x}{x}$

ex. Evaluate analytically: $\lim_{x \to 0} \frac{x \sin 2x}{\sin x}$