1 | Epsilon Delta Proofs

The secrets of the limit

1.1 | Formal Definition of a Limit

[for all $\epsilon > 0$, there exists a δ such that $if\ 0 < |x-a| < \delta,\ then\ 0 < |f(x)-L| < \epsilon$]Limit Definition{$\lim_{x\to a} f(x) = L$}

1.2 | An Epsilon Delta Proof

Let's prove $\lim_{x\to 2} x^2 = 4$ together!

The crux of the proof is to come up with a value δ that is a function of ϵ assuming that $0 < \epsilon$ that meets $0 < |x - a| < \delta$.

Oh, here's some symbols

Symbol	Definition
$\forall$	For all
$\exists$	There exisits
$s.t.$	Such that

And so, the formal and pretentious definition of a limit:

$\lim_{x\to a} f(x) = L\ where\ \forall\epsilon > 0, \exists\delta > 0,\ s.t.\ 0 < |x - a| < \delta \to |f(x) - L| < \epsilon.$

This needs to go before **every Epsilon Delta proof.**

- Step 1: Re-write the Definition Above w.r.t. the function
- Step 2: Do scratch work to identify delta
- Step 3: Plug it in to verify