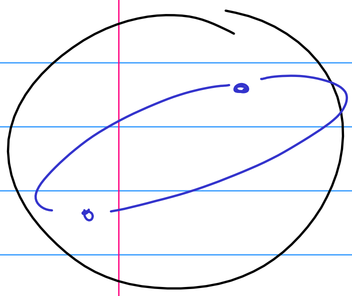
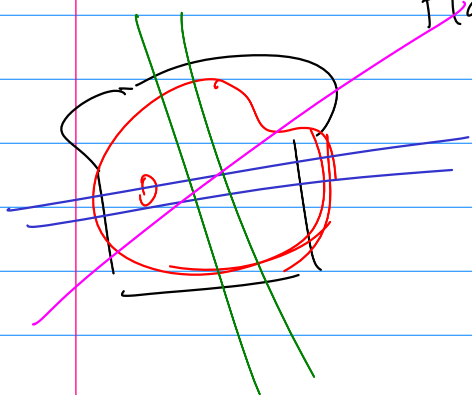
Thm

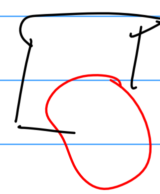
On earth,
At any given time, there exists
a pair of antipodes
at which the temp and the pressure
are the same.

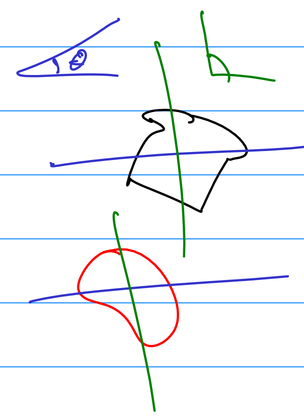


Antipodes

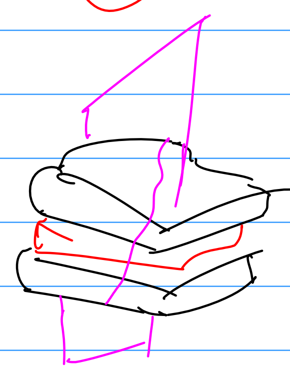
Ham sandwich theorem







3-d variant



1.5 : If two one-sided limits exist and equal L,
then the overall limit exists and equals L.

1.8 : If the overall limits exists and equals L,
and the function at the same place equals L,
then the function is continuous there.

$$\boxed{\begin{array}{c}\lim_{x\to a} f(x) = f(a) \\ \Updownarrow \\ f \text{ is cont. at } a\end{array}}$$

Just defined
or
Just limit existing
alone do not imply continuity!

1.7 The precise def of a limit . . .
1.6 . . . gives us limit laws,
and the direct subst property for

- Polynomials
- Rational functions
- Root functions
- Trig functions

} continuous on their domains, and the DSP works on their domains.

$\lim_{x \to 1} \frac{x^2-1}{x-1}$

1.5 If DSP fails, try manipulating the expression, and try again.

If that fails, check for asymptotes.
Determine whether lim = ∞ or $-\infty$.

This is the only time we are allowed to use a table or a sketch.

Otherwise,
limit DNE.

$\lim_{x \to 5^+} \frac{1}{x-5}$? try $\frac{1}{5.1-5}$, get clues.

Find a cubic function with $f(5) = 60$
and $f(-1) = f(0) = f(6) = 0$
$=0 \quad =0 \quad =0$

$-1, 0, 6$ are zeros of $f(x)$.

$f(x) = 2x^2 - 6x + 4 = 0$
find zeros.

$x = -1 \quad x = 0 \quad x = 6$

$x+1 = 0 \quad x = 0 \quad x - 6 = 0$

$2(x^2 - 3x + 2) = 0$

$2(x-1)(x-2) = 0$

$(x+1) \times (x-6) = 0$

$x - 1 = 0 \quad x - 2 = 0$
$x = 1 \quad x = 2$

$f(x) = \boxed{n} \times (x+1)(x-6) \quad f(5) = 60$

$f(5) = \boxed{n}\, 5(6)(-1)$

$f(5) = -30n = 60$

$\boxed{n = -2}$

$f(x) = -2x(x+1)(x-6)$