Goals for today:

- introductions
- what is a proof?
What is a proof?

A proof is a method for ascertaining a truth.

how can we say if "something" is true or false?

logical explanation for how to get from A → B within given conditions/constraints steps to manipulate A

collected true or false
A *proposition* is a statement that is either true or false.

Example: \[ 1 + 1 = 2. \]

I'm watching you, Wałowski.

*not propositions:*

a) Pass the salt, please.

b) What did you do over break?
Theorem: Given a planar right triangle with side lengths $a$, $b$ and $c$ (meaning there is one angle of $90^\circ$, which we will take to be opposite the side with length $c$), then $c^2 = a^2 + b^2$.

Proof:

area of $\triangle abc = \frac{1}{2}ab$

area of $\square c = c^2$

area of $\square a + b = (a + b)^2$

area of $\square c + 4 \times$ area of $\triangle abc = \square a + b$

$c^2 + 4 \cdot \frac{1}{2}ab = (a + b)^2 = a^2 + 2ab + b^2$

$c^2 + 2ab \quad \rightarrow \quad c^2 = a^2 + b^2$

"PDE" \\
always!