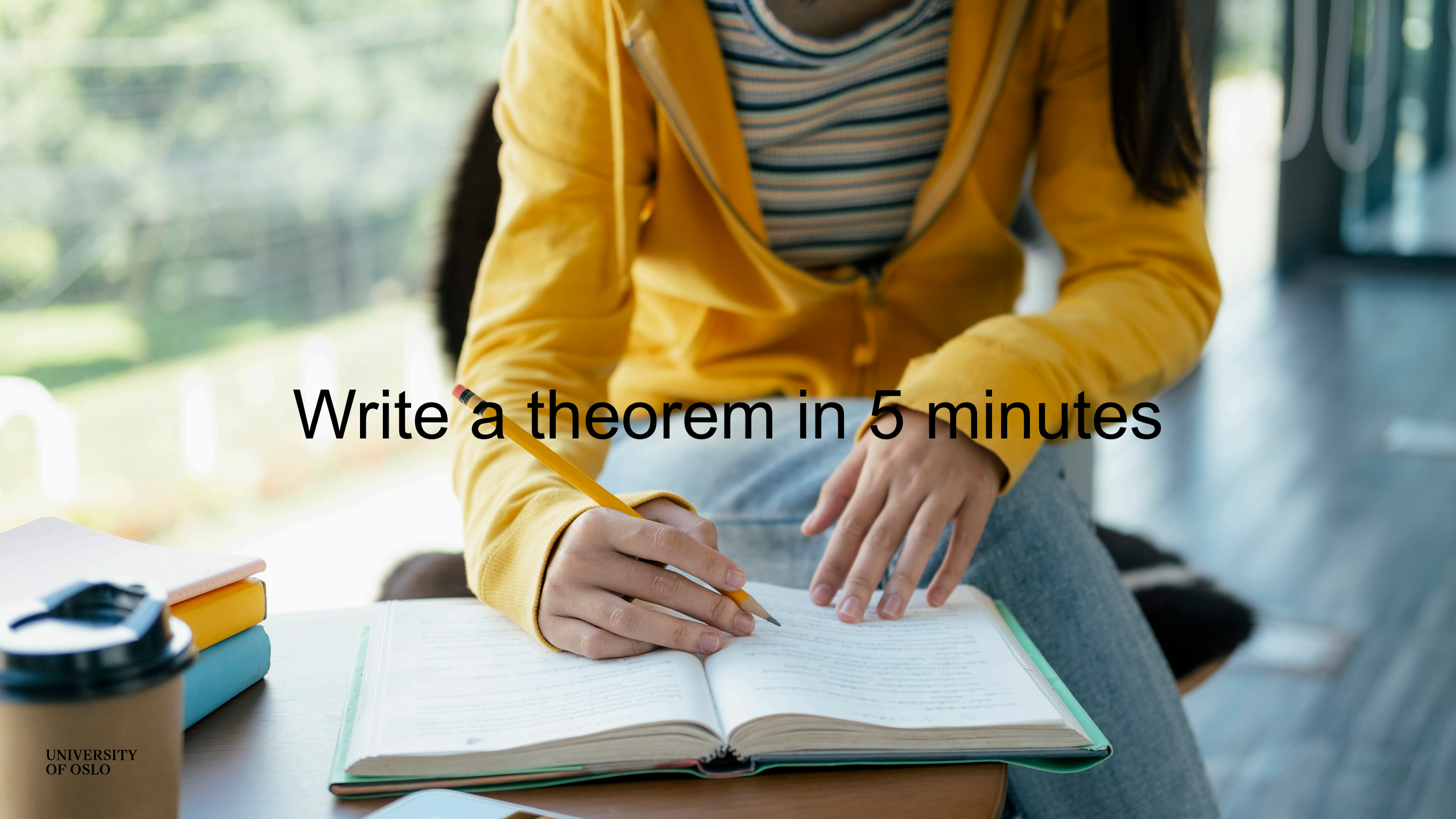


A person wearing a bright yellow hoodie and a striped shirt is sitting at a wooden desk, writing in an open notebook with a yellow pencil. Their left hand rests on the notebook. To the left of the notebook is a brown paper coffee cup with a black lid and a blue strap. Behind the cup are two stacked books, one orange and one blue. The background is a blurred view of green trees and a building, suggesting a university setting.

Write a theorem in 5 minutes

5 minute theorem - Individually

State Pythagoras' theorem



PYTHAGORAS.

5 minute paper – review in pairs

Switch texts with a neighbour and consider

- What did the text start with?
- What terms are used to state the result?
- Are there any unexplained/undefined terms?
- Is the notation consistent?
- Superfluous notation or terms?
- Did they draw a figure?
- How did they refer to the figure in your text?

5 minute paper – review II

Things to consider

- Define concepts – how and where?
 - Right angled triangle
 - Hypotenuse
 - Cathetus (Rarely used in English)
- Figures are helpful!
- Consider your of audience
- Notation
 - a, b, c
 - h, k_1, k_2
- Is the notation introduced?
 - In text
 - In the figure
 - In both

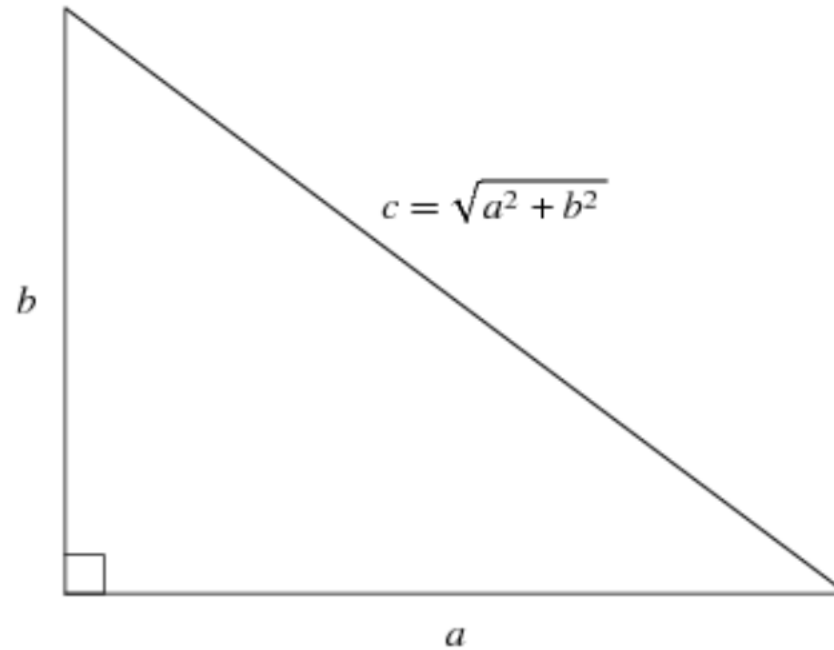
Pythagorean Theorem



DOWNLOAD
Wolfram Notebook



EXPLORE THIS TOPIC IN
The MathWorld Classroom

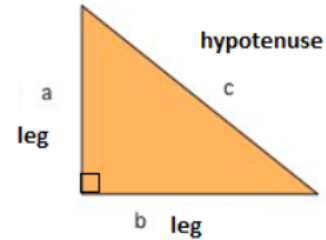


For a right triangle with legs a and b and hypotenuse c ,

$$a^2 + b^2 = c^2.$$

The Pythagorean Theorem

One of the best known mathematical formulas is Pythagorean Theorem, which provides us with the relationship between the sides in a right triangle. A right triangle consists of two legs and a hypotenuse. The two legs meet at a 90° angle and the hypotenuse is the longest side of the right triangle and is the side opposite the right angle.



The Pythagorean Theorem tells us that the relationship in every right triangle is:

$$a^2 + b^2 = c^2$$

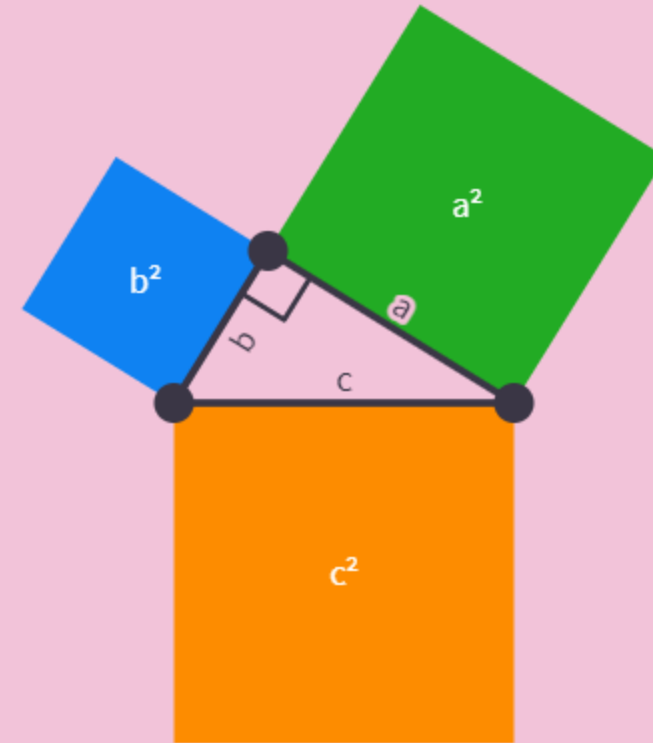
<https://www.mathplanet.com/education/pre-algebra/right-triangles-and-algebra/the-pythagorean-theorem>

Pythagoras' Theorem

In any right-angled triangle, the square of the length of the **hypotenuse** (the side that lies opposite the right angle) is equal to the sum of the squares of the other two sides. In other words,

$$a^2 + b^2 = c^2$$

*The converse is also true: if the three sides in a triangle satisfy $a^2 + b^2 = c^2$, then it must be **right-angled**.*



<https://mathigon.org/course/triangles/pythagoras>

Euclid – Book I - Proposition 47

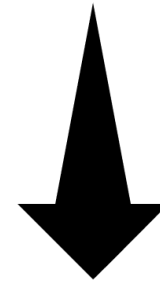
In a right triangle, the square drawn on the side opposite the right angle is equal to the squares drawn on the sides that make the right angle.

Stating a result

Conditional statements

- Notation and terms are best defined in advance
- All assumptions should be present in the statement
- A conditional statement has a conclusion
- Get a feeling for the difference between Theorems, Propositions, Lemmas, Corollaries, and Conjectures (Latex has different environments for all of these)

Assumptions



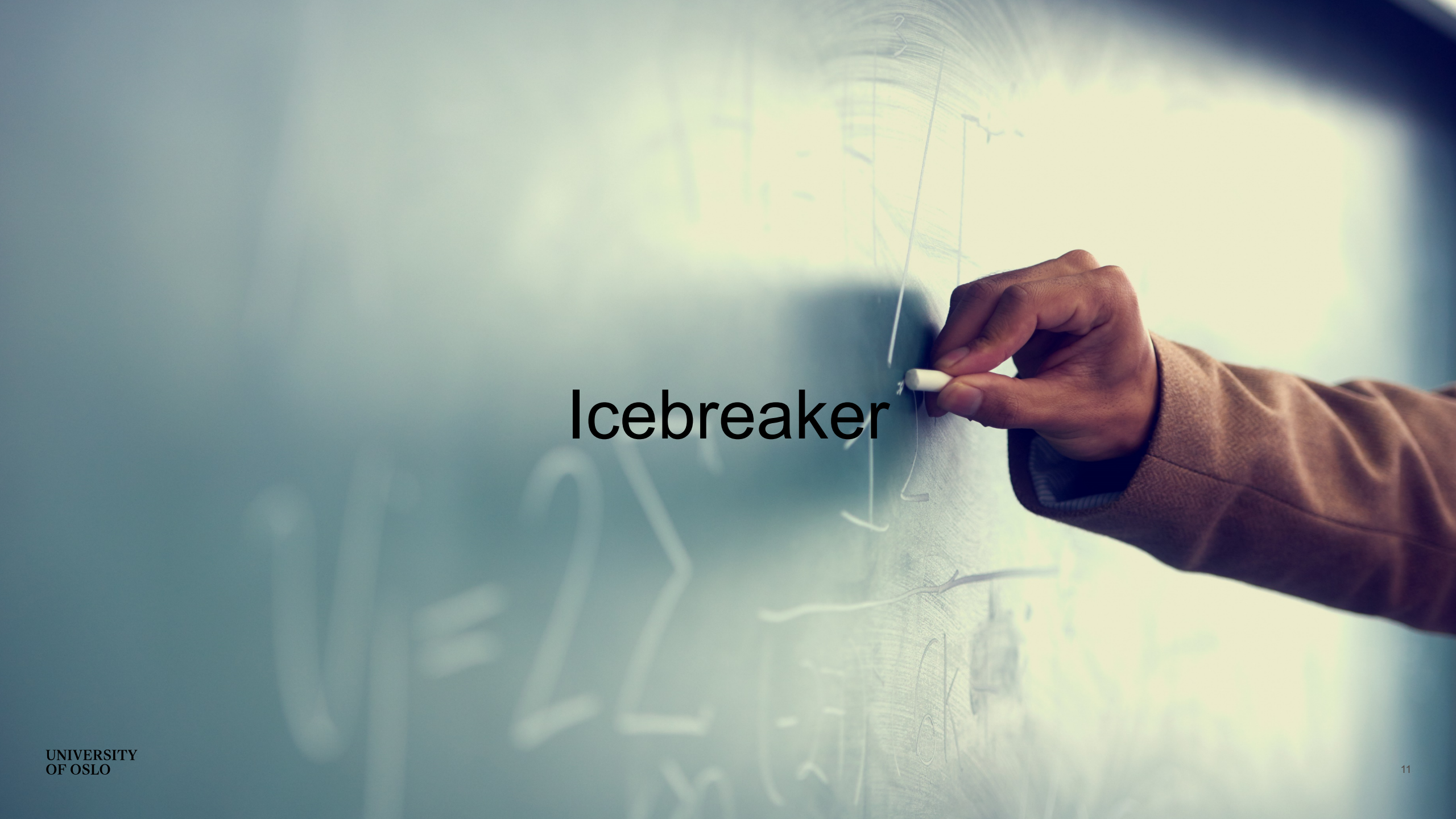
Conclusion

Results and proofs

- Axiom (Building block)
- Definition (Meaning of word/symbol)
- Theorem (Strong result)
- Proposition (Smaller result)
- Lemma (Intermediate or technical result used mainly to prove another result)
- Corollary (Follows from a theorem or proposition)
- Conjecture (Not proven)
- Remark
- Proof

See: Kranzt “A Primer of Mathematical Writing”

<https://arxiv.org/pdf/1612.04888>

A close-up photograph of a hand holding a piece of white chalk, writing on a chalkboard. The hand is wearing a brown jacket. The chalkboard is filled with faint, blurry chalk markings, including numbers like '2' and '3', and some illegible text. The word 'Icebreaker' is overlaid in a large, black, sans-serif font in the center of the image.

Icebreaker