

Lesson 3.5a | Proof Progressions

Unit 3: Proof and Congruence • Student Notes and Check Your Understanding

Notes — The Architecture of a Proof

A proof is a chain of conditional statements, connected by the law of syllogism.

The conclusion of one step becomes the antecedent of the next. In a flow chart proof you can see this: each box feeds into the next through an arrow. At some points two or more boxes converge into one — multiple antecedents combining into a single consequent.

What can be a starting point in a proof (does not need to follow from a previous step):

These facts can start a chain. They still need to be cited when used. Everything else must follow from something that came before it.

Planning a Proof

There is more than one way to plan a proof. Here are three starting points:

- 1. Start from a familiar intermediate step.** Find something you know how to handle — often proving two triangles congruent — and build outward in both directions.
- 2. Start from the conclusion and walk backward.** Ask: what would have to be true just before this conclusion? Keep asking until you reach something you can justify from the given or the diagram.
- 3. Start from the given and write what you know.** Write everything you can state from the given information and the diagram. See where it leads. Useful when you cannot yet see the full path.

Trying a path that does not work is not failure. It is reasoning. Ask yourself why it did not work and what a different path might look like. With practice, all three approaches combine.

Notes — Flow Chart Proof Format

In this course, proofs are written as flow chart proofs or paragraph proofs. Two-column proofs are not used.

Flow chart proof: Each statement in a box. Arrows connect boxes showing logical flow. Justifications written below statements. When two statements both feed into one conclusion, two arrows point into the same box.

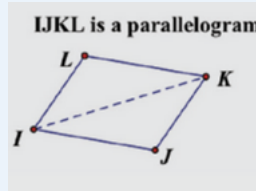
Paragraph proof: Written as connected sentences in logical order. Each claim followed immediately by its justification. A reader should be able to follow the logic without gaps.

Proof Practice — Progression Task

Use the backward walk-back to plan, then write a complete flow chart proof.

Given: IJKL is a parallelogram.

Prove: $IL \cong JK$



Planning Space

Use this space for scrap work and planning during the board activities.

My proof (flow chart or paragraph, written forward from given to conclusion):

Remember: write the definition of CPCTC before using it.