

## ***Proof-Scrambling Activities: Objectives & Advice for Educators***

**Contents:** There are three activities in this “proof scrambling” collection:

- two similar activities with mathematical proofs whose sentences have been broken out, scrambled, and numbered for the student(s) to identify the correct logical order
- one proof-scrambling quiz for students to work on either in class, or as a take-home quiz

**Objectives:** The primary objectives of these activities are for students to be able to...

- ...identify when a collection of sentences form a correct mathematical proof.
- ...recognize how words like “therefore”, “next”, “further”, “finally”, “assume”, etc. are used intentionally in proofs to indicate the direction of the author’s logic.
- ...get experience reading and comprehending proofs written by others.

**Advice for Educators:** I have had nothing but good experiences with using these activities in my “Foundations of Mathematics” (transition to advanced mathematics) course. The sequencing I use for these activities is to have students work in groups on scrambled proofs #1 and #2, in that order, after we have spent time discussing proof techniques and the language of mathematical proofs.

I hand out those activities on separate class days, along with scissors and tape. (Many students are visual or tactile learners and prefer to have their hands on the individual sentences and visually see where they might go on a piece of paper.)

Scrambled proof #1 is a very reasonable mathematical proof for the students to reconstruct as we cover similar types of proofs in our class. However, they have never seen this particular statement or proof before. Nonetheless, the students might struggle initially, but they quickly make progress and succeed in constructing a correct proof.

Scrambled proof #2 is a mathematical proof none of the students will understand, even after unscrambling the proof. But when you remind them to clue in on the language of the proof, they really seem to pick up on the connecting words like “thus”, “therefore”, and “finally” and get a sense of where in the proof those sentences are likely to be.

The quiz is the final step in this sequence of activities. I ask the students to work individually on a take-home quiz where they have to unscramble a mathematical proof they have likely not seen before (as in proof #2) but is not the most difficult proof they have ever seen (perhaps as in proof #2). I typically give the students a short turn-around time of 24 hours for this quiz.

Anyone wishing for more information or discussion of these activities, don’t hesitate to email me at [goodmanr@central.edu](mailto:goodmanr@central.edu).