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Stavrou, Stavros Georgios

Common errors and misconceptions in mathematical proving by education undergraduates.

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Summary: Ninety-seven education students majoring or minoring in mathematics had their math homework examined in a Number Theory or Abstract Algebra course. Each student's homework was observed for the purpose of identifying common errors and misconceptions when writing mathematical proofs. The results showed that students collectively made four recurring errors: assuming the conclusion in order to prove the conclusion, proving general statements using specific examples, not proving both conditions in a biconditional statement, and misusing definitions. In the same courses taken subsequently by 91 new students, we informed them about these common errors prior to assigning their homework to see how the students' proving processes would differ. The results showed that more exercises were left blank with comments such as "I'm not sure how to start the proof", and that many students provided unnecessary examples to supplement their valid proofs.

Classification: D79 E59 F69 H49

Keywords: undergraduate students; error patterns; misconceptions; mathematical concepts; proving
<http://www.k-12prep.math.ttu.edu/journal/1.contentknowledge/stavrou01/article.pdf>