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Engaging with constructive and nonconstructive proof.

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Summary: One method of proof is to provide a logical argument that demonstrates the existence of a mathematical object (e.g., a number) that can be used to prove or disprove a conjecture or statement. Some such proofs result in the actual identification of such an object, whereas others just demonstrate that such an object exists. These types of proofs are often referred to as constructive and nonconstructive, respectively. In this article, the authors share four tasks that they use to encourage secondary school students and preservice mathematics teachers to consider the conditions under which an example or counterexample, or even the logical demonstration that an example exists, can serve as a proof. The authors have regularly observed that students and others working through these tasks expand their approaches to proving statements and solving nonroutine mathematical problems. Thoughtful use of the tasks presented in this article can help students develop mathematical power and proficiency. (ERIC)

Classification: E53

Keywords: proving; constructive proofs; nonconstructive proofs; counterexamples

<http://www.nctm.org/Publications/mathematics-teacher/2015/Vol108/Issue6/Engaging-with-Constructive-and-Nonconstructive-Proof/>