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After work on a mathematics problem, one might (be asked to) communicate a solution. Communicating mathematical reasoning is central to teaching practice and has recently gained emphasis in inquiry-based and other reform college classes. Yet what does it mean to communicate proof? What processes and evaluations occur between the construction and communication of proof? What constitutes clarity? Answers to such questions will give guidance to professors on how to improve lectures.

We report analysis based on data from 10 practicing mathematicians. We presented each mathematician with a statement that uniformly took under a minute to validate as true, yet on average more than 10 minutes to finish writing its proof. We then asked each mathematician to revise proofs of a statement that again was validated swiftly yet took care to communicate.

From the mathematicians' working thoughts and interviews, we propose an initial framework for the processes behind and characterization of clear mathematical communication. Time allowing, we may contrast the mathematicians' work with student work on similar tasks. Our results will shed insight into the communicative goals of proof presentation and highlight important aspects of proof that can be emphasized to achieve these goals. (Received September 21, 2009)