"A proof is any completely convincing argument." *Errett Bishop*

What constitutes a completely convincing (mathematical) argument? As it turns out this is not a completely simple question, but . . .

Some basic guidelines:

- Set the stage and introduce the characters, e.g. "Let x and y be real numbers . . ."

- Give any context. "Suppose $x > y$ . . ."

- Carefully, step-by-step explain how to arive at the conclusion, given your set-up.

- State your conclusion.

In particular, I expect you to write in complete sentences with correct grammar, etc. You may want to use a word-processor with equation editing capabilities (e.g. MS Word). The computational software *Mathematica*, which has been installed on all the lab computers, also has mathematical typesetting capabilities. Personally, I use LaTeX, which is a formatting language for writting mathematics papers. You can produce documents with LaTeX with various software, e.g. proTeXt (for Windows) or MacTeX (for Mac OS), both available for free online.

Note: The guidelines above are *not* meant to be a procedure for arriving at the *idea* of a proof but rather a set of guidelines for writing your proof formally. Coming up with the key insight needed for a proof and writing a proof out formally are two completely different things. In my experience, there is no sure-fire method for producing the key insight needed for a proof. Sometimes I make up an example for myself, verify that the theorem is true for that example, and then ask myself, "Why is this working?"

For a (lengthy) discussion of what constitutes a proof and how that notion has changed over time, see Steven Krantz' article *The History and Concept of Mathematical Proof*, available at his website (http://www.math.wustl.edu/∼sk/eolss.pdf).