Math 476 - Abstract Algebra 1
Advice on Writing Algebraic Proofs

Here are some steps and suggestions to keep in mind when you work on proofs in Abstract Algebra.

- Read through the statement you are trying to prove at least once. Make note of key terms that are used.

- Call to mind the definitions of key terms – try to remember these as precisely as possible.

- Develop a clear idea of what is being asked and determine exactly what you need to accomplish in order to complete the proof.

- Think about possible avenues you could use to make progress on the proof. Do you know any proofs that are similar to what is being asked? Are there any previously proven results that might apply? Do you know any techniques that could be used in the current situation?

- If necessary, be creative and inventive. Avoid going too far "off script". If the question is being asked on a traditional assessment, it can probably done mainly using ideas and content you have seen before (perhaps with some adaptation and/or modification).

- Work examples and/or carry out specific computations to build intuition (an example is not a proof, but you may be able to use ideas from a specific example or computation to build a formal argument)

- One you have both a goal and a strategy, build your formal argument. Make sure that each step is justified – have reasons for each step (you should have both a reason for DOING that step and a reason explaining why it is TRUE).

- If you get stuck, make sure that each previous step is correct and justified, and then think about where you currently are, where you need to get, and possible ways to get there. Is necessary, go back to a previous step and think about alternative approaches.

- Once you complete your argument, read back through – as you do so, look for errors. These include both computational errors, and, perhaps more importantly, conceptual and logical errors. Make sure that each step is justified and, perhaps more importantly, that the entire process and flow of your argument makes good sense.

- If you have additional time, rewrite your argument to make it as clear, direct, precise, and understandable as possible.