

Tips for writing proofs

- ① Write the statement out precisely and explicitly.
Use mathematical terms and equations.
Note the direction of the implication: \Rightarrow , \Leftarrow or \Leftrightarrow
If it is \Rightarrow .
"Beginning/known" \Rightarrow "End"

Three parts:

(a) The Beginning — what you know, what you can assume.

(c) The Middle.

(b) The End — What you want to show.

- ② Try a small simple example to see if you can find any patterns. Don't be afraid to try several!
Scibble, Doodle etc.

Write out any other results, theorems, definitions that might be related on a side piece of paper.

- ③ Manipulate both sides — beginning and end to see what goes in the middle. Simplify complex notation if needed. Try things.

It is OK to make mistakes! You might try a manipulation, and it might not work. You don't have to know if it will work or not before trying it.

Always: Justify each step!

- ④ Know that there are different styles of proofs you can try:
- (a) Constructive proofs.
 - (b) Proofs by contradiction