MATH 240 Introduction to Proofs

Summary

Terminology

IFF

- IF and only IF
  TFAE
- The Following Are Equivalent

Reading a proof

Outline: suppose ... is a solution to ... show it is obtained from ... and a solution to ...

Direct Proofs

Try right off the start.
A chain of implications leading from our assumptions to the desired statement

Proofs by contraposition

p is a statement, then not p is the negation of p
eg) p: a is even, not p: a is not even

contraposition: prove "p->q" by showing "not q -> not p"

Proofs by contradiction

Given a set of assumptions *A*, then we can deduce a statement *B*
So we assume that

- our assumptions A are all true
- *B* is false
  and we prove that we can deduce that
- one asssumetion from *A* is false

In short: to prove that "If A then B", we can instead prove that "If A and not B then not A" which is a contradiction