

COLLABORATIVE HOMEWORK - Week 5

Math 135: First Steps into Advanced Mathematics

Due February 15, 2011 5:00pm

Name (Print): _____

Remember that although you may discuss this assignment with others, your write up should be your own.

Consider the statement: For all integers x , if 4 does not divide x^2 , then x is odd.

(Note that your answers in (a)-(c) should be in relation to this theorem not the general outline groups wrote on the board during presentations. In other words, if you want to say "assume the hypothesis is true" you actually want to tell me what the hypothesis is. So you should say "assume BLAH is true" where BLAH comes directly from the statement above.)

(a) State your assumptions and final conclusion (that is, your two main proof steps) if proving this statement by direct proof.

(b) State your assumptions and final conclusion if proving this statement by proof by contraposition.

(c) State your assumptions and final conclusion if proving this statement by proof by contradiction.

(d) Write any definitions you need to prove the statement.

(e) Do at least two examples that illustrate the concepts in the statement. In particular, produce one x which fulfills the hypothesis of the statement and one that does not. Be sure to explain what your examples are showing.

(f) Write a rough draft/outline of a proof where you prove the statement by contraposition.

(g) Write a final draft of the proof you worked on in part (f). It should be beautiful with nothing crossed out, etc.

(h) Would either of the other two techniques be useful? Why or why not?