

## Math 330 – Homework Instructions

The following uses Homework 1 for illustration, but its rules also apply to all other homework assignments

- (a) Unless expressly stated otherwise, to prove a proposition or theorem, you are allowed to make use of everything in the book up to but **NOT including** the specific item you are asked to prove.
- (b) A “ $\diamond$  term” that contains more than two items needs grouping: When you write  $x \diamond y \diamond z$ , do you mean  $(x \diamond y) \diamond z$  or  $(x \diamond y \diamond z)$ ?

PROOF of Theorem 3.2 (Uniqueness of the inverse in groups), VERSION 1:

We have

$$g'' \stackrel{\text{neutral elem}}{=} e \diamond g'' \stackrel{\text{inv elem}}{=} (g' \diamond g) \diamond g'' \stackrel{\text{assoc}}{=} g' \diamond (g \diamond g'') \stackrel{\text{inv elem}}{=} g' \diamond e \stackrel{\text{neutral elem}}{=} g'$$

and this proves uniqueness.

PROOF of Theorem 3.2 (Uniqueness of the inverse in groups), VERSION 2:

We have

$$\begin{array}{l|l} g'' = e \diamond g'' & e \text{ is neutral element} \\ = (g' \diamond g) \diamond g'' & g' \text{ is inverse element of } g \\ = g' \diamond (g \diamond g'') & \text{associativity} \\ = g' \diamond e & g'' \text{ is inverse element of } g \\ = g' & e \text{ is neutral element} \end{array}$$

This proves uniqueness.

**Of course, you can also do a hybrid of versions 1 and 2.**

Please make my life easier and avoid references like (3.5) if you can use an (abbreviated) English language expression for it. (That may not always be possible, but please try). In this particular case: write “inv elem” or “ $xx$  is inverseor ... instead of (3.5)