Math 330 Section 6 - Spring 2024 - Homework Instructions

(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 $x \diamond (y \diamond z)$?

(c) The following rewrite of the proof of Theorem 3.2 (Uniqueness of the inverse in groups) is a good template for you to follow for the proofs of Homework 1.

Proof of Theorem 3.2 (Uniqueness of the inverse in groups), **VERSION 1**

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

This proves uniqueness.

Proof of Theorem 3.2 (Uniqueness of the inverse in groups), **VERSION 2**

$g'' = e \diamond g''$	e is neutral element
$= (g' \diamond g) \diamond g''$	g' is inverse element
$= g' \diamond (g \diamond g'')$	associativity
$= g' \diamond e$	g'' is inverse element
$= g'$	e is neutral element

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

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 lanugage expression for it. (That may not always be possible, but please try).
In this particular case: write"inv elem" or "xx is inverse" or ... inastead of (3.5)