Math 330 Section 3 Homework 1

Written assignments:
First submission: Wednesday, September 2
Last submission: Wednesday, September 16

Reading assignment 1 - due: Tuesday, September 1(!) *Read carefully ch.1 through prop. 1.17. Be prepared to take a quiz which asks for*
axioms 1.1 - 1.5, the meaning of "$x \in A$" when $A+$ is a set,
reflexivity, symmetry, transitivity and the replacement principle for "$=$",
the meaning of "if A then B" for statements A and B
the definition of "$p|q$"
the definition of "even" integers

Reading assignment 2 - due: Wednesday, September 2 *Read carefully all of ch.1. Be able to reproduce the additional definitions:*
the definition of "$x - y$"

Propositions you should be able to write down (not how to prove them):
prop.1.10, prop.1.12, prop.1.13 (how do those last two differ?), prop.1.18, prop.1.19, prop.1.23, prop.1.26

General note on written assignments: *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. Example: assignment 5 below: to prove prop.1.11 (iv) you may use everything up to and including prop.1.11 (iii).*

Written assignment 1:

Prove Prop.1.8: Let $a \in \mathbb{Z}$. Then $(-a) + a = 0$.

Written assignment 2:

Prove Prop.1.10: Let $a, x_1, x_2 \in \mathbb{Z}$. If both $a + x_1 = 0$ and $a + x_2 = 0$ then $x_1 = x_2$.

Written assignment 3:

Prove Prop.1.11(ii), part 1: Let $a, b, x, y \in \mathbb{Z}$. Then $a + \big(b + (x + y)\big) \;=\; (a + b) + (x + y)$

Written assignment 4:

Prove Prop.1.11(ii), part 2: Let $a, b, x, y \in \mathbb{Z}$. Then $(a + b) + (x + y) \;=\; \big(a + (b + x)\big) + y$

Obviously you'll have to utilize ax.1.1(ii) to prove #3 and #4. Tell me me what you plug in for m, n, p in that axiom.

Written assignment 5:

Prove Prop.1.11(iv): Let $x, y, z \in \mathbb{Z}$. Then $x(yz) \;=\; z(xy)$