

Math 330 Section 1 - Spring 2016 - Homework 01

Due date: Wednesday, January 27, 2016

Running total: 5 points

Last submission Wednesday, February 10, 2016

General note on reading assignments: Each reading assignment usually has its individual due date. Take it seriously: You may have an unannounced quiz this coming Wednesday about reading assignment 1. This is the third time that I am teaching this class and my experience is that many students are not even able to reproduce the relatively few definitions given in the assigned reading. If you do not learn the material properly then your grades will suffer.

Reading assignment 1 - due Wednesday, January 27: 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: Thursday, January 28 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

Reading assignment 3 - due Friday, September 29: Click the link "Sets part 1" in the course materials page of the web site and read the document according to the guidelines I have outlined. Of particular importance are the three methods of proof for set identities in ch.1.11 (Set identities).

As is true for all the additional readings, be prepared to encounter different notation in the book and in lecture. In lecture you will see
 $A \setminus B$ instead of $A - B$ for the set difference,
 $A \Delta B$ instead of $A \oplus B$ for the symmetric set difference,
 Ω instead of S or U for the universal set,
 A^c or A^c instead of \bar{A} for the complement.

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 $a + (b + (x + y)) = (a + b) + (x + y)$

Written assignment 4:

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

Obviously you'll have to utilize ax.1.1(ii) to prove #3 and #4. Tell 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 $x(yz) = z(xy)$