

HOMWORK ASSIGNMENT NO. 7

DATE: JANUARY 26, 2010 DUE: FEBRUARY 9, 2010

Explain the following questions clearly. Use techniques from the book by Chartrand, et al. In problems (1) through (4) assume that A, B and C are sets.

- (1) Give a proof of the statement “If $A \cup B = A$, then $B \subseteq A$ ”
- (2) Give an example of three sets of integers A, B and C such that $A \cap B = A \cap C$, but $B \neq C$.
- (3) Give an example of three sets of integers A, B and C such that $A \cup B = A \cup C$, but $B \neq C$.
- (4) Prove that if $A \cup B = A \cup C$ and $A \cap B = A \cap C$, then $B = C$.
- (5) Give examples of sets of objects and a relation on those objects with the following properties:
 - (a) reflexive and symmetric but not transitive
 - (b) reflexive and transitive but not symmetric
 - (c) symmetric and transitive but not reflexive
 - (d) reflexive but neither symmetric nor transitive
 - (e) symmetric, but neither reflexive nor transitive
 - (f) transitive, but neither reflexive nor symmetric

Your examples should have the set of objects that this relation is defined on clearly stated (it may be an infinite set like the integers or a two element set like $\{a, b\}$ but make sure you clearly state what it is).