

Problem Set 7 Foundations Due 4/2/2007

Four of these problems will be graded, with each problem worth 5 points. Clear and complete justification is required for full credit. You are welcome to discuss these problems with anyone and everyone, but must write up your own final submission without reference to any sources other than the textbook and instructor. Submissions must be on clean paper with no ragged edges.

1. Determine whether the relation \sim on \mathbb{R} defined by $x \sim y$ iff $xy \leq 0$ is reflexive, symmetric, or transitive. Provide defense of your answers.
2. Determine whether the relation \sim on \mathbb{R} defined by $x \sim y$ iff $xy < 0$ is reflexive, symmetric, or transitive. Provide defense of your answers.
3. Do #3 in §5.3.
4. Does the truth of #3 in §5.3 actually depend on the condition that $(\forall a \in A)(\exists b \in A)[a R b]$?
5. Do #6 in §5.3.
 - ▶ Call a relation R on a set A **transitive** iff $(\forall a, b, c \in A)[a R b \vee b R c \Rightarrow a R c]$.
6. Suppose that R is a transitive relation on a set A and $(\exists a \in A)[(a, a) \in R]$. Show $(\forall b, c \in A) [(b, c) \in R]$