

Relations Tutorial Problems

1. Constructing a concrete relation

Construct a relation R on the set $\{1, 2, 3\}$ such that all the following are true:

- $1R2$
- R is symmetric
- R is transitive
- R is not an equivalence relation

(You are constructing just one relation which satisfies all four conditions, not a separate relation for each condition. You can specify the relation however you want: a diagram with arrows, a table of related pairs, etc.)

2. Discussion manual problems

Do the following problems from the discussion manual. (Note that when these problems say something like “Define a relation R on A such that ...”; they mean “*We are hereby defining* a relation R on A such that ...”. In particular, it is *not* asking *you* to provide a definition.)

- 4.2 parts (a) and (b)
- 4.3 part (a), except you do not need to prove the relation is an equivalence relation.
- 4.3 part (b)

3. Abstract relation proof

Let R and S be symmetric relations on some set A . Define a relation \sim on A such that $x \sim y$ if and only if xRy and $\neg(xSy)$. Prove that \sim is symmetric.