

2.6 Relations

Def 6.1: Ordered pair

$$(a, b) = \{\{a\}, \{a, b\}\}$$

Thm 6.2: If $(a, b) = (c, d)$ then $a = c$ and $b = d$.

Def 6.4: Cartesian product

Let A and B be sets. The cartesian product of A and B is

$$A \times B = \{(a, b) : a \in A \text{ and } b \in B\}.$$

Def 6.7: Relation

Let A and B be sets. A relation between A and B is any subset R of $A \times B$.

$a \in A$ and $b \in B$ are related by R if $(a, b) \in R$ and we write aRb .

Def 6.9: Equivalence relation

A relation R on a set S is an equivalence relation if for all x, y and z in S the following properties hold:

- i) xRx (reflexivity).
- ii) If xRy then yRx (symmetry).
- iii) If xRy and yRz then xRz (transitivity).

Recommended homework for section 2.6: 6.1, 6.3, 6.4, 6.6, 6.7, 6.9, 6.11(a-e).