***Discrete Math1*. Handwriting Assignment #4**

**Due to 26th/April**

1. **  
   (a) By definition R3 is a subset of AxA. List all the elements of R3.  
   (b) Which of the relations are reflexive?  
   (c) Which of the relations are symmetric?**

**(d) Which of the relations are transitive?  
(e) Which of the relations are asymmetric?  
Solution)  
(a) R3 = {(a, c), (b, c), (c, a), (c, b)}  
(b) R1 is reflexive. R2 and R3 are not reflexive  
(c) R1 is not symmetric. R2 and R3 are symmetric since their tables are symmetric with respect to the main diagonal.**

**(d) R1 is transitive. R2 and R3 are not transitive**

**(e) refer to (c)**

1. **Let A = {1, 2, 3, 4} Give an example of a relation on A that is:**
   1. **reflexive and symmetric, but not transitive**
   2. **symmetric and transitive, but not reflexive**
   3. **symmetric, but neither transitive nor reflexive.**

**You must prove that your relation satisfies the stated conditions.**

**Solution) **

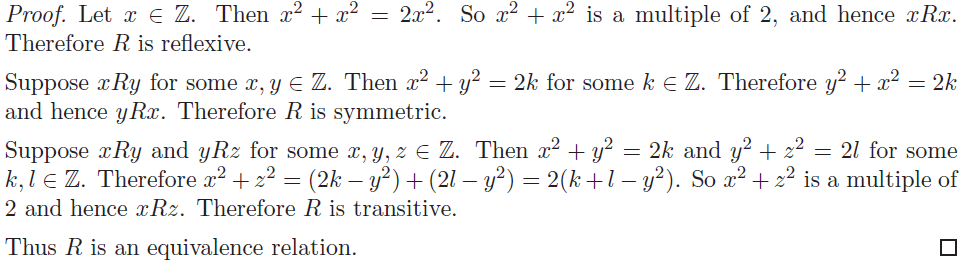
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1. **For each of the following relations on R, state whether it is reflexive, symmetric, antisymmetric.  
   (a) R1 = {(x; y)| x + y = 0}  
   (b) R2 = {(x; y)| x = 1}  
   Solution)  
   (a) R1 is not reflexive, it is symmetric, it is not antisymmetric,  
   (b) R2 is not reflexive, it is not symmetric, it is antisymmetric,**
2. **Let A be the set {1, 2, 3}. Answer the following.  
   (a) Consider the relation {(1, 1),(2, 2),(3, 1),(3, 3)} on A.   
   Determine whether or not it is an equivalence relation. If it is not, state which properties it is lacking. If it is, describe the partition it determines by listing the subsets of the partition.   
   (b) Repeat (a) for the relation {(1, 1),(2, 3),(2, 2),(3, 2),(3, 3)} on A**

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1. **Prove that R is an equivalence relation, where R is a relation on Z given by the following. xRy if and only if x2 + y2 is a multiple of 2.  
   Solution  
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