***Discrete Math*. Handwriting Assignment #4**

**Due to 11th/May**

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?**

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.**

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}**
2. **For each of the following relations, state whether or not it is (a) reflexive, (b) symmetric, (c) antisymmetric and (d) transitive.   
   Whenever your answer is “no”, explain why. This means that if, for instance, you say that a relation R is not symmetric, you must exhibit a pair (a, b) such that (a, b) ∈ R but (b, a) ∉ R.**

**(a) The relation “divides”, on Z (“m divides n” means “n/m is an integer”).(b) {(m, n) ∈ Z × Z : the sum of the digits of m equals the sum of the digits of n}.**