Discrete Mathematics

2023-24 Semester 1

Assignment 01 Information

Q1.
Refer to the definitions of reflexive, symmetric, antisymmetric, and transitive relations.
If S is reflexive, symmetric, antisymmetric and/or transitive, prove.
If S is not reflexive, symmetric, antisymmetric and/or transitive, counter-example should be given.

Q2.
Consider the definition of the set operation "Difference".
If the statement is true, prove. (General case should be considered.)
If the statement is false, give a counter-example.

Q3.
Refer to the definitions of injective function and bijective function.
Pre-images of elements could be considered.

Q4.
If the statement is true, prove by contradiction. Assumption should be written down clearly.
If the statement is false, counter-example should be given.

Q5.
(a)
An English statement should be written down.
(b)
With the use of the given predicates, translate the statement into a logical expression.
(In the statement, only $\forall, \exists, \vee, \wedge, \neg$, and/or $\rightarrow$ can be used.)

Q6.
The use of truth tables is recommended in both parts.
Please note that there may be no solution, unique solution, or many solutions. In case of many solutions, all solutions should be included.