

Assignment - 3

Q1. Give an example of relations R_1, R_2, R_3, R_4 and R_5 on $A = \{4, 5, 6, 7, 8\}$ having property

- (i) R_1 is reflexive and transitive but not symmetric
- (ii) R_2 is symmetric and antisymmetric
- (iii) R_3 is antisymmetric but not reflexive
- (iv) R_4 is neither symmetric nor antisymmetric
- (v) R_5 is neither symmetric and asymmetric nor antisymmetric

Q2. Give an example of relations R_1, R_2, R_3 and R_4 on $A = \{a, b, c\}$ having property

- (i) R_1 is irreflexive and antisymmetric
- (ii) R_2 is asymmetric and antisymmetric
- (iii) R_3 is asymmetric but $R_3 \cup R_3^{-1}$ is symmetric
- (iv) R_4 is transitive but $R_4 \cup R_4^{-1}$ is not transitive

Q3. A set A be a set of books.

- (i) let R_1 be a binary relation on A such that (a, b) is in R_1 if book 'a' costs more and contains fewer pages than book 'b'.

☐

Tell its properties.

A R C

- ① Reflexive \times Irreflexive \checkmark
- ② Sym \times , Asy \checkmark , Ant \checkmark
- ③ Trans \checkmark

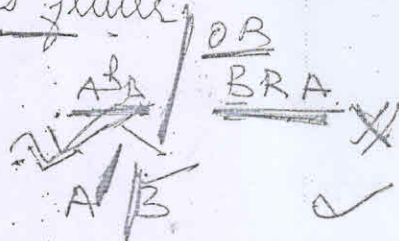
Synt

Ref X, I_r ✓, $M \times$



(ii) $R_2 =$ 'a' costs more or contains fewer pages than book 'b'.

Tell its properties.



Q4. Tell $R = \{(a, b) \in R, a - b \leq 1 \text{ on the set } I_+\}$ is having/not having which properties

Q5. Prove $R = a - b$ is divisible by 5 $\forall a, b \in I_+$ is equivalence relation

Q6. Let $A = \{a, b, c, d\}$

$$R = \{(a, b)(b, c)(c, d)(d, a)(a, d)(d, a)\}$$

(i) Reflexive closure

(ii) Symmetric closure

(iii) Transitive closure

Q7. Let $A = \{p, q, r, s\}$ defined by partition

$P = \{\{p, s\}, \{q, r\}\}$. Tell the equivalence Relation

Q8. Let R be equivalence Relation on set $A = \{1, 2, 3, 4, 5\}$
 $R = \{(1, 1)(2, 2)(3, 3)(4, 4)(5, 5)(1, 4)(4, 1)(2, 4)(4, 2)(1, 2)(2, 1)\}$
Determine equivalence classes

Q9. Let $A = \{1, 2, 3, 4\}$ and $R = \{(2, 1)(2, 3)(3, 2)(4, 3)\}$
Find Transitive closure by both methods