MATHS

BOOKS - MODERN PUBLICATION

RELATIONS AND FUNCTIONS

Example

1. State the reason for the relation R, in the set {1,2,3} given by R= {(1,2), (2, 1)}, not to be transitive.

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2. Let A be the set of all students of a boys school. Show that the relation R in A given by R= {(a,b) : a is sister of b}is the empty relation and R' = {(a,

b) : the difference between heights of a and b is less than 3 meters} is the universal relation.

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3. If

$N_7 = \{1, 2, 3, 4, 5, 6, 7\}, does the follow \in g partition give rise \to an \equiv a \leq$

Why?A _1 = (1,2,5,6), A _2 = {3}, A_3 = {4,6}`

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4. If R is the relation 'lessthan from A={1,2,3,4,5} to B={1,4,5}. Write down the cartesion product corresponding to R. Also find the inverse relation to R.

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5. Let Z be the set of all integers and R be the relation on Z defined as $R = (a, b) : a, b$in` Z and a-b is divisible by 5) Prove that R is an equivalence relation.

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6. Let L be the set of all lines in the plane and R be the relation in L, defined as $R = (L_1, L_2) : L_1$ is perpendicular to L_2). Show that R is symmetric but neither reflexive nor transitive.

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7. Let T be the set of all triangles in a plane with R a relation in T given by : $R = \{(T_1, T_2) : T_1$ is congruent to T_2}. Show that R is an equivalence relation.

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8. Show that the relation R defined in the set A of all polygons as $R = \{(P_1, P_2) : P_1 \text{ and } P_2$ have same numbers of sides} is an equivalence relation.

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9. Let 'm' be a given positive integer. Prove that the relation, Congruence modulo m' on the set Z of all integers defined by : $a \equiv b(\mod m) \Leftrightarrow (a-b)$ is divisible by m is an equivalence relation.

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10. Let A = (1,2,3,..........,9) and R be the relation in $A \times A$ defined by (a,b) R (c,d) if: a+d=b+c for (a,b), (c,d) in $A \times A$. Prove that R is an equivalence relation. Also obtain the equivalence class {(2,5)}

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11. Let N denote the set of all natural numbers and R be the relation on NxN defined by $(a, b)R(c, d) <=> ad(b + c) = bc(a + d)\cdot$ Check whether R is an equivalence relation on $N \times N\cdot$

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12. Show that the relation R in the set : $R = \{x : x \in Z, 0 \leq x \leq 12\}, givenby$: R = {(a, b) : |a - b|` is a multiple of 4} is an equivalence relation.

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13. Let R be the relation defined in the set A = {1, 2, 3, 4, 5, 6, 7} by R = {(a, b) : both a and b are either odd or even}. Show that R is an equivalence relation. Further, show that all the elements of the subset {1, 3, 5, 7} are related to each other and all the elements of the subset {2, 4, 6} are related to each other, but no element of the subset {1, 3, 5, 7} is related to any element of the subset {2, 4, 6}.

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