

NCERT Solutions Class 12 Maths Chapter 1 Relations and Functions

Question 1:

Determine whether each of the following relations are reflexive, symmetric and transitive.

- (i) Relation R in the set $A = \{1, 2, 3, \dots, 13, 14\}$ defined as

$$R = \{(x, y) : 3x - y = 0\}$$
- (ii) Relation R in the set of \mathbb{N} natural numbers defined as

$$R = \{(x, y) : y = x + 5 \text{ and } x < 4\}$$
- (iii) Relation R in the set $A = \{1, 2, 3, 4, 5, 6\}$ defined as

$$R = \{(x, y) : y \text{ is divisible by } x\}$$
- (iv) Relation R in the set of \mathbb{Z} integers defined as

$$R = \{(x, y) : x - y \text{ is an integer}\}$$
- (v) Relation R in the set of human beings in a town at a particular time given by
 - (a) $R = \{(x, y) : x \text{ and } y \text{ work at the same place}\}$
 - (b) $R = \{(x, y) : x \text{ and } y \text{ live in the same locality}\}$
 - (c) $R = \{(x, y) : x \text{ is exactly } 7\text{cm taller than } y\}$
 - (d) $R = \{(x, y) : x \text{ is wife of } y\}$
 - (e) $R = \{(x, y) : x \text{ is father of } y\}$

Solution:

- (i) $R = \{(1, 3), (2, 6), (3, 9), (4, 12)\}$
 R is not reflexive because $(1, 1), (2, 2), \dots$ and $(14, 14) \notin R$.
 R is not symmetric because $(1, 3) \in R$, but $(3, 1) \notin R$. [since $3(3) \neq 0$].
 R is not transitive because $(1, 3), (3, 9) \in R$, but $(1, 9) \notin R$. [$3(1) - 9 \neq 0$].
 Hence, R is neither reflexive nor symmetric nor transitive.
- (ii) $R = \{(1, 6), (2, 7), (3, 8)\}$
 R is not reflexive because $(1, 1) \notin R$.
 R is not symmetric because $(1, 6) \in R$ but $(6, 1) \notin R$.
 R is not transitive because there isn't any ordered pair in R such that $(x, y), (y, z) \in R$, so $(x, z) \notin R$.
 Hence, R is neither reflexive nor symmetric nor transitive.
- (iii) $R = \{(x, y) : y \text{ is divisible by } x\}$
 We know that any number other than 0 is divisible by itself.
 Thus, $(x, x) \in R$
 So, R is reflexive.

Ncert Class 12 All Chapter Exercise Answer

Dr. Rastogi, Goyal



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