





# **Relations & Functions**

Lecture: 03

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# Today's Goal: :

# **Types of Relations:**

# **Definition of Functions:**







#### From NCERT:

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

Relation R in the set  $A = \{1, 2, 3, \dots, 13, 14\}$  defined as R =  $\{(x, y): 3x - y = 0\}$ 

R:  $A \rightarrow A$   $\Rightarrow$   $R \equiv \{(1,3), (2,6), (3,4), (4,12)\}$ Reflinive  $(a,a) \in R \Rightarrow Not \Rightarrow Not reflexive$ 

Symplific (a,b)  $\in R \Rightarrow (b,a) \in R \Rightarrow \text{Not Symplific}$  = transfine  $(1,3) \in R \Rightarrow (3,9) \in R \Rightarrow (1,9) \in R \Rightarrow \text{not transfine}$ Relation R in the set  $A = \{1,2,3,4,5,6\}$  defined as  $R = \{(x, y): y \text{ is divisible by } x\}$ 

Reflerive (x, x) means og is divisible by x le Reflerive



The > x is divisible by x but 2 is not divisible by 4 -> Not Dymetrin for transitive:

\[
\text{yr} \times \text{y divisible by } \times \time x RZ = Z is dividish by x  $Z = n_2(n_1 x)$ le jes transfice =) Z = (integral) n



#### Problems based on Types of Relations:

### From NCERT:

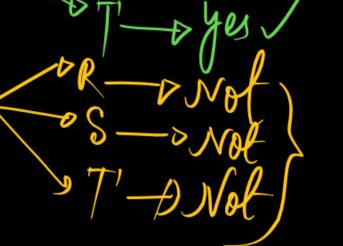
Determine whether each of the following relations are reflexive, symmetric and transitive:

3. Relation R in the set A of human beings in a town at a particular time given by

(a) 
$$R = \{ (x, y): x \text{ is exactly } 7 \text{ cm taller than } y \}$$

(b) 
$$R = \{ (x, y): x \text{ is wife of } y \} \longrightarrow S \longrightarrow N_0$$

(c) 
$$R = \{ (x, y) : x \text{ is father of } y \}$$

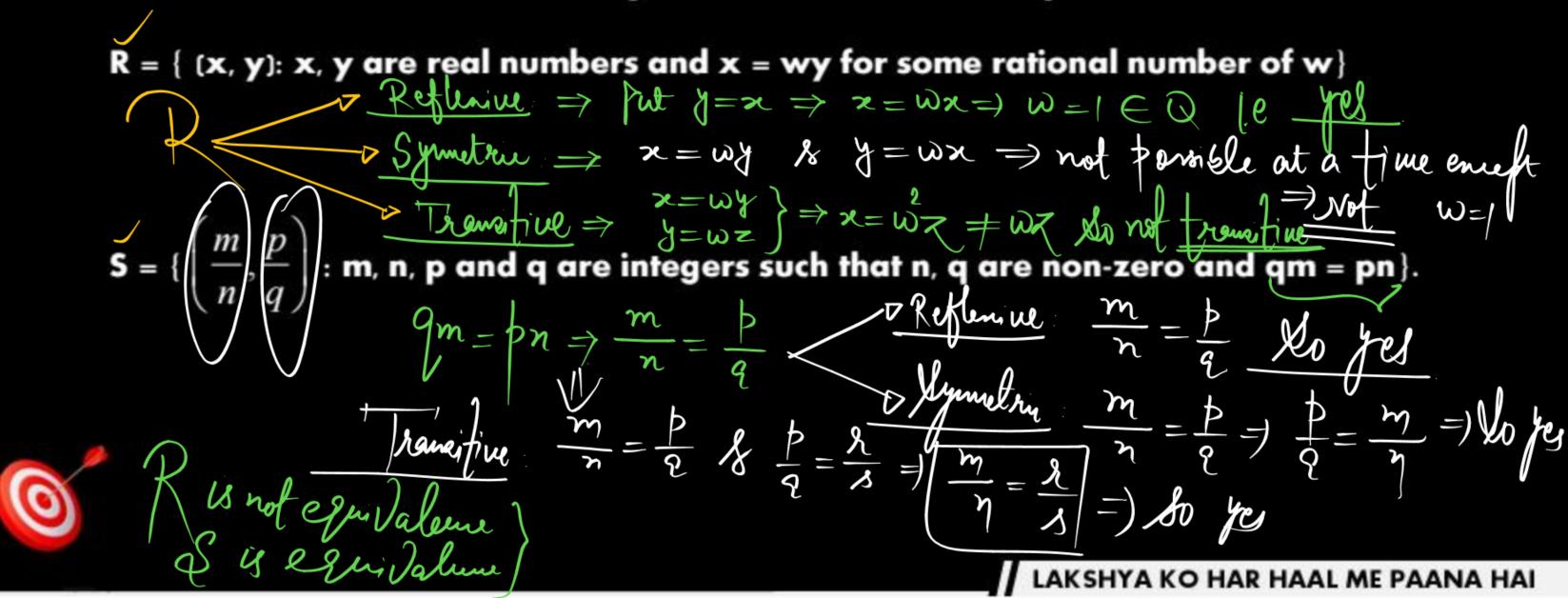




#### Problems based on Types of Relations:

#### From JEE MAIN (2010):

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





#### Problems based on Types of Relations:

# Some More Standard Problems:

Reflerive:

fut 
$$\gamma = x \Rightarrow x - x + \sqrt{2} = \sqrt{2} \notin Q \Rightarrow \text{frue} \Rightarrow \text{yes}$$

$$x = y = x - y + \sqrt{2} \neq 0$$

$$y = y = x + \sqrt{2} \neq 0$$

$$x = \sqrt{2}$$

$$x = \sqrt{2}$$

$$y = y = x + \sqrt{2} \neq 0$$

$$x = \sqrt{2}$$

$$x$$

$$\begin{array}{c} xRY \Rightarrow x-y+\sqrt{2} \notin Q \\ JRz = J-Z+\sqrt{2} \notin Q \\ x=\sqrt{2} \\ y=1 \\ z=2\sqrt{2} \end{array}$$

$$\frac{Q}{2\sqrt{1-\sqrt{2}}} \qquad x = \sqrt{2}$$

$$x = \sqrt{2}$$

$$y = 1$$

$$z = \sqrt{2}$$

a, 6 ER John assistment: + Lam of a 8 5 = 4 Frereixe \* |a-5| Sy Lis parallel to be of Over \* I is persendecular to by



# Thank You Lakshyians