1-10

1) Sequence $\nu : \mathbb{N} \to S$

$\{s_1, s_2, s_3 \ldots\}$ roster method

$\langle s_i \rangle_{i \in \mathbb{N}}$ gen'l term (indexed)

2) k-tuples $(a_1, a_2, \cdots a_k)$

2-tuple is pair (ordered)

cartesian product of sets A, B is

$A \times B = \{(a,b) : a \in A, b \in B\}$

$A \times B \times C = \{(a,b,c) : \text{———}\}$

$\mathbb{R} \times \mathbb{R} = \mathbb{R}^2$ is most common

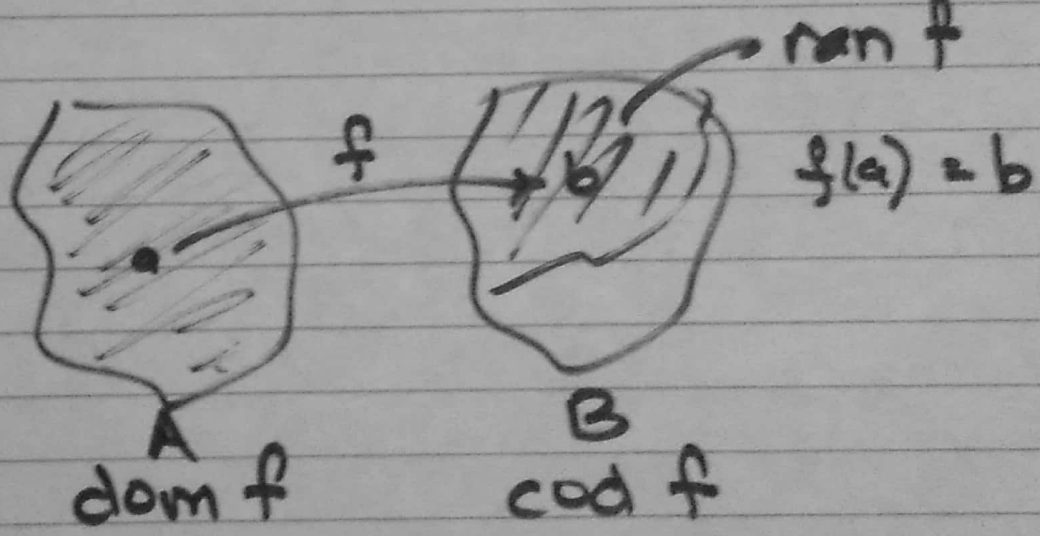
②

Given sets A, B, form $A \times B$

$R \subseteq A \times B$

f = <u>function</u> is a relation, say on $A \times B$ with <u>this property</u> if (a,b) and (a,c) belong to rel'n f, then <u>$b = c$</u> !!

This makes rel'n a function.



If ran f = cod f f is <u>onto</u> sorjective

$$\left.\begin{array}{lll} \text{If} & f(a) \neq f(b) \Rightarrow a \neq b \\ \underline{\text{or}} & f(b) = f(a) \Rightarrow a = b \end{array}\right\} f \text{ is } \cancel{} \text{ injective or } 1{:}1$$

An injective and surjective function is bijective.

$+ : \mathbb{Z} \times \mathbb{Z} \to \mathbb{Z}$ binary function

$f : A \to B$

$+ : (a,b) \mapsto a+b$

$\downarrow \qquad \downarrow$

$\mathbb{Z} \times \mathbb{Z} \qquad \mathbb{Z}$

$(A \times B) \cdot C \qquad f(A, B, C)$

$\mathbb{R}^3$

$f : \mathbb{R}^3 \times \mathbb{R}^3 \times \mathbb{R}^3 \to \mathbb{R}$

relation on X is subset of $X \times X = R$

1) if $(a,a) \in R$ $\forall a \in X$ R is reflexive

2) if $(a,b) \in R \Rightarrow (b,a) \in R$ we call

R symmetric

3) if (a,b) & $(b,c) \in R$ then $(a,c) \in R$

R is transitive

We call R an equivalence rel'n