

## MATHS CLASS XII ( Relations and Functions) Continuation.....

**General direction for the students** :-Whatever be the notes provided , everything must be copied in the Maths Copy and then do the Home work in the same Copy. g

### COMPOSITION OF FUNCTIONS

Let  $f: A \rightarrow B$  and  $g: B \rightarrow C$  be two functions, then the function from A to C is defined as  $g \circ f$  is known as composite function.

$\Rightarrow g \circ f: A \rightarrow C$  defined by  $g \circ f(x) = g(f(x)), \forall x \in A$ .

- Composition of two function is also known as Resultant of two functions or the Function of Function.
- Here Range of f must be a subset of domain of g.

### Properties of Composition functions

1. The composition of function is Associative
2. If f and g are one one , the  $g \circ f$  is also one one but converse may not be true.
3. If f and g are onto , the  $g \circ f$  is also onto but converse may not be true.
4. If  $f: A \rightarrow B$  is a function and  $I_A, I_B$  are identity functions on A, B respectively , then

$$(i) I_B \circ f = f \quad (ii) f \circ I_A = f$$

**\*\* For the explanation above points , watch the video class.**

### Exercise 1.4

3. Given  $A = \{ 1, 2, 3, 4 \}$  ,  $f: A \rightarrow A$  ,  $g: A \rightarrow A$

$$f = \{ (1, 4), (2, 1), (3, 3), (4, 2) \}, \quad g = \{ (1, 3), (2, 1), (3, 2), (4, 4) \}$$

i)  $g \circ f = \{ (1, 4), (2, 3), (3, 2), (4, 1) \}$

ii)  $f \circ g = \{ (1, 3), (2, 4), (3, 3), (4, 2) \}$

iii)  $f \circ f = \{ (1, 2), (2, 4), (3, 3), (4, 1) \}$

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6. Given  $f: R \rightarrow R$  defined by  $f(x) = x^2 - 3x + 2$

$$f \circ f(x) = f(f(x)) = f(x^2 - 3x + 2)$$

$$= (x^2 - 3x + 2)^2 - 3(x^2 - 3x + 2) + 2$$

$$= x^6 + 6x^4 + 12x^2 + 7$$

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**HOME WORK** : Left over questions from the exercise.

Class 12 Maths