**Function:**

Function is a special relation between two sets. If all/each element of set A, assign a unique element of another set B, the collection of such assignments is called a function A into B, and denoted by

Example:

This is a function , as every elements of makes a relation with .

This is not a function, as every elements does not make relation with . Moreover, the element 8 make relation with two elements of.

**Domain/Codomain/Range:**

Domain of the function is the set of all elements of First sets.

Here: Domain:; input sets.

Codomain of the function is the set of all elements of Second set.

Here: Codomain:; some input sets.

Range of a function is the set of those elements that make participate with relation.

Here: Range:; output sets.

**Example:**

Let } and }; and .

If ; Find out the domain and Range of the function.

**Answer:**

=

=

=

Domain: }

Range: }

**Example 3.1(P.66):**

State whether or not each diagram in Fig. defines a function from} into}.

A

(c)

(b)

B

B

A

A

B

(a)

1. No. There is nothing assigned to the element .
2. No. Two elements : x and z are assigned to
3. Yes, each elements of A has unique relation to B.

**Example**

Let. Sketch and determine whether or not each relation below is a function from X into X.

1. }

**Answer**:

(c)

(b)

a)

Domain

Range

Range

Domain

Range

Domain

No. The element does not appear as the first co-ordinate in any ordered pair in g.

Yes. Although appears as the first co-ordinate in two ordered pairs in h. But this pairs are equal.

No. Two different ordered pairs (2, 3) and (2, 1) in f have the same number 2 as their first co-ordinate. Although original domain is same as ordered pair.

**Types of Function:**

1. **One-one (One to one) function:**

A function is said to be one to one (1-1) if different elements is the domain A have distinct images. Another array of saying the same thing is that f is one-to-one if) implies.

B

A

=

=

=

1. **Onto Function :**

A function is said to be an onto function if each element of B is the image of some elements of A i.e . But if , than all elements of B can be found the image of A. In other words, is onto if the image of f is the entire codomain.

A

B

=

=

=

1. **Invertible function:**

A function is invertible if its inverse relation is a function from B to A. [Both one to one and onto].

B

A

=

=

=

**Example:**

**Onto function**:

B

A

Onto Also one-to-one

All elements of B are the image of elements of A.

**Composite function:**

Given that ,and

. Find

1. Range of f, g, and

**Answer:**



1. Range of

Range of

Range of

C

B

A

B

A

B

A

B

A

A

B

**Example:**

One to one

1. is an one to one function as for different values, The values of are also different.

(Similarly: )

1. and is not an one to one function. Because for ; and ; are get same value (output) That is for different input values (-3 and 3), output values are same which is controversy of definition.

Onto:

For and ; and is an Onto function.

Answer: =>for

,

So is an Onto function

**Composite Function:**

In the composition of Two or more function when output of one function is used to another function as input. Then this function is called composition function or product function.

Generally:

B

C

A

For this case:

Example:

Find:

Example:

. Find

Example:

Find

**Identity Function:**

For A set – if and any elements i.e. .

Example: for any element: 1,2,-2,……

The image co-domain are same.

B

A

.

**Constant function:**

B

A

is said to be a constant function

If a particular element of B, makes relation with all the elements of A.

i.e. The image of is The image of all element of A

Ex: (or any number); for is a constant function

as

Rules for determining the domain function:

1. For case of
2. For case square root: =>inside the symbol.
3. For case of Logarithm: