Discrete Mathematics

Functions

Defintion of a function - Part 3

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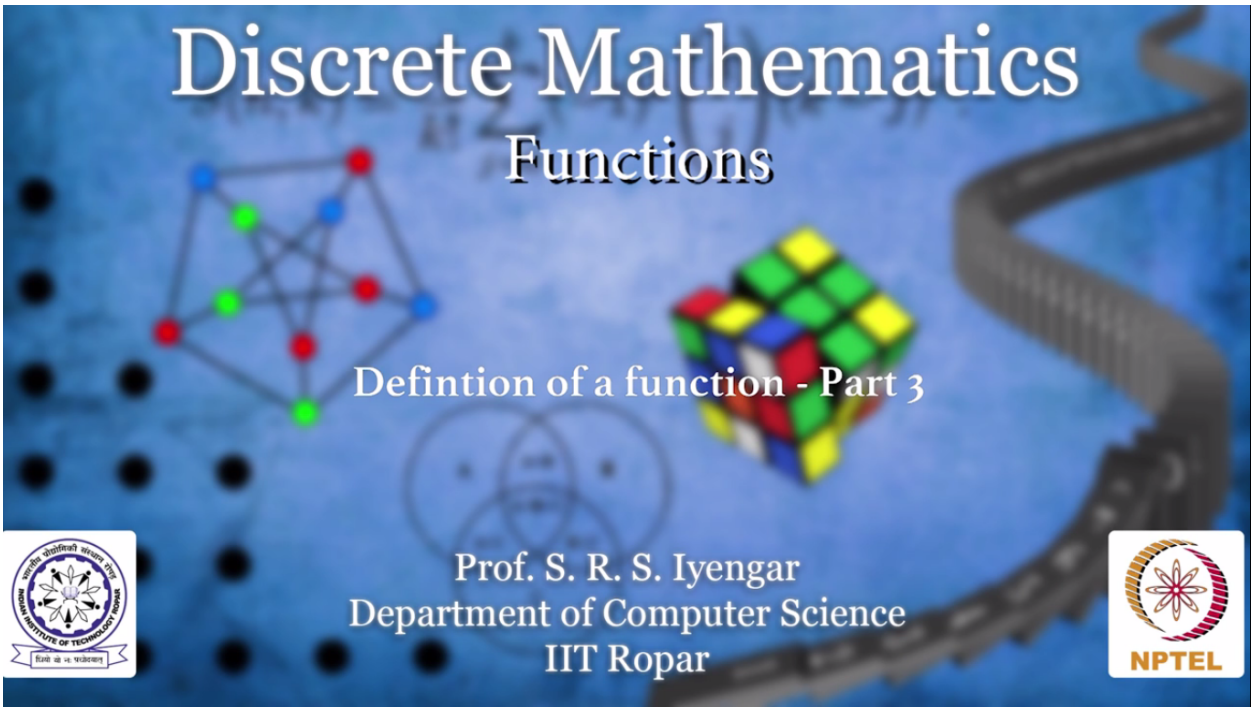
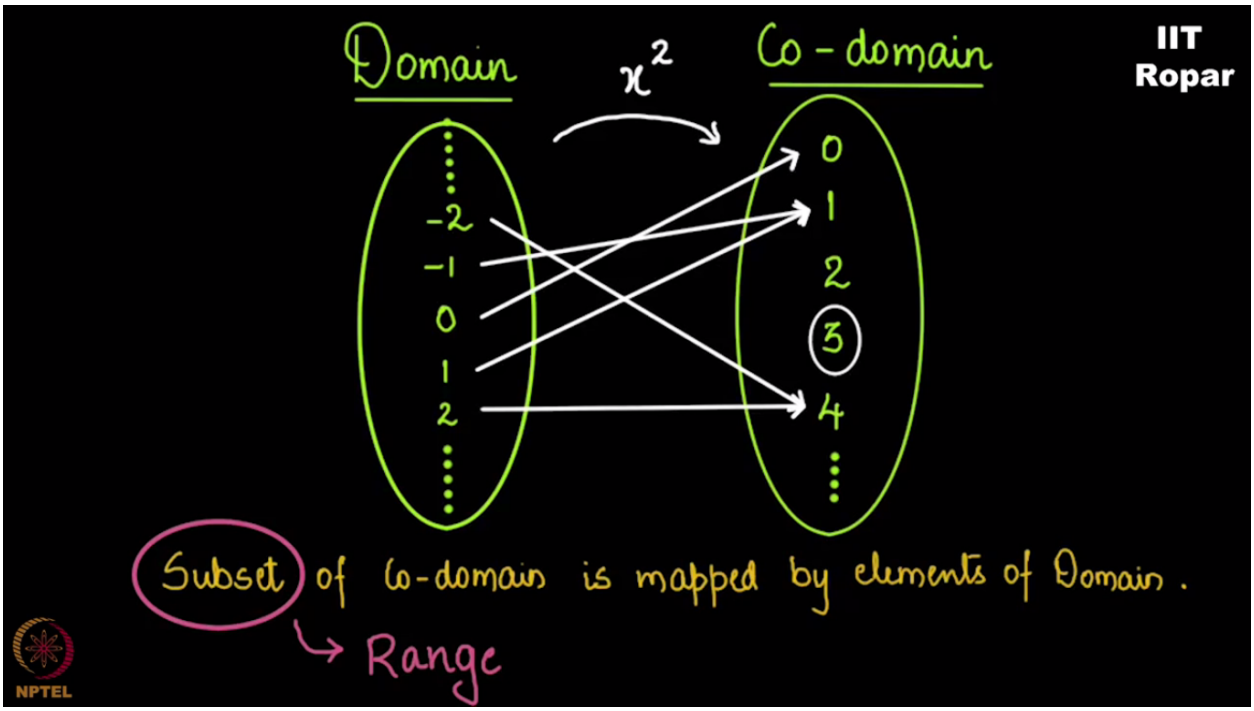


In mathematics one thing that complicates the subject is heavy usage of notations and definitions. Although it is possible for us to illustrate things with examples and intuitive explanations, it is difficult for us to keep doing it as we advance the subject. We have been giving you examples for functions and related topics in plain English but now we have reached that point where we cannot go ahead without defining a few things. So bear with me. I need to define a few things and develop the notations that we will be using for the rest of the chapter.

There is not much of definitions beyond what I am going to say right now. It is only these four to five concepts. So listen carefully. You will soon get used to these notations. So firstly let me take an example of a function f from some set X to some other set Y and this set is called the domain and where it takes to is called the co-domain. For example if I were to take a function f from let's say integers to positive integers. Okay. I also include 0 here let's say, okay, defined by f of x is equal to x square okay. So my domain here is going to be the whole of Z which includes positive and negative integers, let me write that down 0, -1, -2, so on, 0 +1, +2 and so on and then I am defining a function f which takes all these elements to it's square and -2 goes to 4, -1 goes to 1, 0 goes to 0, +1 goes to 1, +2 goes to 4 and so on correct. The function is f of x is equal to x square.

So now this is called the domain. This is called the co-domain and as you can see not every element in co-domain is being mapped by an element of domain. For example, there is no element that goes to 3. You can always say root 3 the square of root 3 is 3 but then that root 3 is not included in the domain you see. So root 3 is not there and hence 3 is not being mapped by any element.



Do you see that the subset of this co-domain is being mapped by some elements of the domain? And that subset is what goes by the name range. By range we mean a range of values that the function f takes. So you you now know what's a domain, what's a co-domain and what is a range. You say 4 to be an image of the element 2, and 2 is a pre-image of 4. 25 is an image of 5 and 5 is the pre-image of 25.