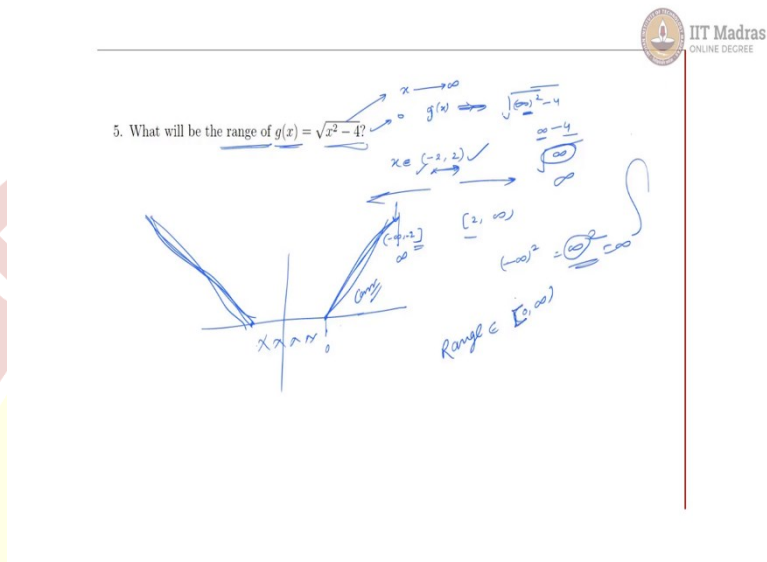


**IIT Madras**  
ONLINE DEGREE

**Mathematics for Data Science 1**  
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**Week 08 - Tutorial 05**

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For our fifth question, we are supposed to find range of a function  $g(x)$  which is a  $x^2 - 4$ . And you can understand that this function is actually not defined at  $x =$ , I mean in the domain of  $x = -2$  to  $2$ . At  $2$  they are defined because we get  $0$ . So, for finding the range, first we need to find what the domain is. The domain will tell what will be the range.

So, we do not need to see in this region, the value of function in this region we do not need to see, we will look only where the  $x$  is this side or  $x$  is this side. So, we will see in  $-\infty$  to  $[2, \infty)$ , because here it is open so this will be closed, we discussed this in our earlier question fourth b you can see that.

Now, if we find that where are the function is defined only, I will try to draw a graph, a hypothetical graph which is rough diagram. So, at  $2$  this will give  $0$  and  $-2$ , this will be  $-2$ , this will give  $0$  what will happen if I take if I go towards and we have here. So, this is if I take  $x \rightarrow \infty$ , what will I get,  $g(x)$  is  $=$  which is tending to actually  $\infty^2 - 4$  and this will be the  $\infty^2$  which will give again  $\infty$  only there is nothing called  $\infty^2$ .

This is a very large number and the square of the large number it will be large that is all, and  $-4$  means what?  $\infty - 4$  this will again give  $\infty$  and if you take square root then again this the  $\infty$

only. So, in we have here so that the function gives the  $\infty$  positive at positive  $\infty$ , which means it will be something, we cannot go in this reason, this reason we cannot go, so will stop here.

The same thing happened here because this was a quadratic function. If you take  $-\infty$ , then  $-\infty$  square will also give  $\infty$ , square and we will get same thing here  $= \infty$ . So, this is actually symmetric, why? Because it was already quadratic. This is not a linear function do not see this as a line. This is a curve, it might be like this or this, we can verify with using Desmos.

So, I will recommend you to go to the Desmos and see that correct graph, but the rough diagram we can understand what will be the domain and range. So, for this domain we will get ranges here 0 and here  $\infty$ , which means the range is actually  $[0, \infty)$ . 0 will be involved or not. As we can get 0 at  $x = 2$ , then 0 will be involved.

