An Introduction to Microeconomics
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Lecture – 52
DMRS and Convexity: Example

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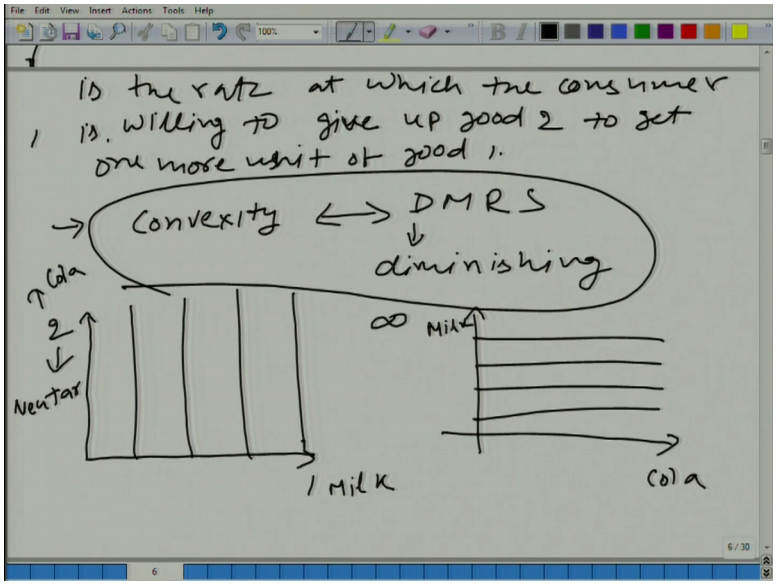

And let us take some example, where what we have is, on x axis we have good 1 and on y axis let us say just share good 1 and good 2, not necessarily the item 2, item 1 and item 2. Let us say there is an individual who does not care for the item 2. Let us for example, let us say that good 1 is milk, and good 2 is cola and an individual does not like cola he does not drink his, he is indifferent. Then how would his indifferent curve look like. It does not care about good 2. So, then it is vertical line nothing else.

So, what would be the marginal rate of substitution here. Marginal rate of substitution of good 1 with respect to good 2 is infinity. By the way here in this case we call good 2 as Neutar, Neutar for this particular person. What we can have is, and let us say if I change, let us say now I talk about marginal rate of substitution, let us say good 1 is milk and good 2 is cola. Now I say milk is on x axis, y axis and cola is 1 y axis. Can you draw the indifference curve.

Student: yes

Horizontal line, and what would be the marginal rate of substitution. See just be careful, when we are talking about marginal rate of substitution of milk with respect to cola, it would it still is infinity, but marginal rate of substitution of cola with respect to milk is 0. So, when we do not say when we say juts MRS, we are not using any particular term, you can use both way, either you can say of good 1 with respect to good 2 or of good 2 with respect to good 1, but by convention we will follow that whenever we say MRS.

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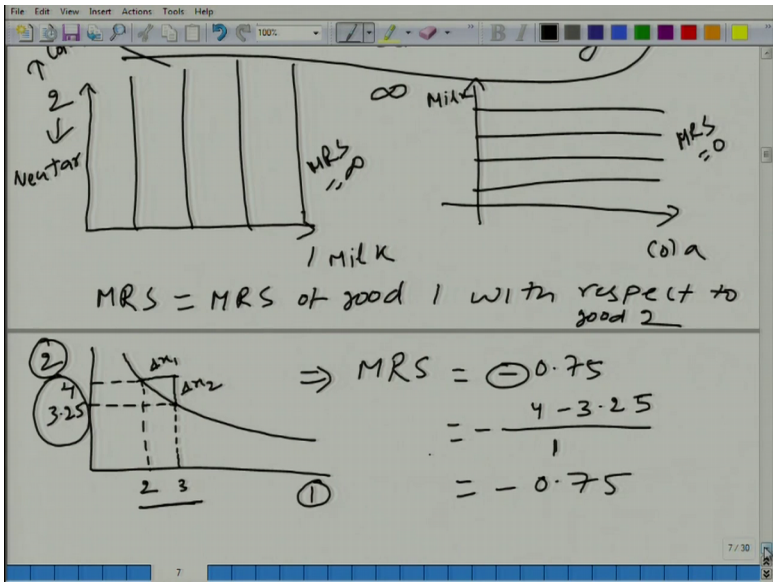

What we mean is, MRS of good 1 with respect to good 2. Is it clear? We will always use this, yes here is 0 and MRS here is infinity, but in both the examples MRS of cola is infinity, the axis marginal rate of substitution could not change fine.

So, just be careful what we are talking about. This is you know a point of confusion many people just change the axis when they talk about it, and you get completely different result. Instead of getting x you get 1 by x, and y, let us see what do we mean by marginal rate of substitution mathematically. So, let us say this is good 2 and this is good 1, what we have here is, an indifference curve. Of course, I have taken an indifference curve of a person who exhibit, whose preference exhibits convexity. What we are talking about is, let us say 2 points, let us say this is 2 and this is 4, does not matter this is and then what we have here is 3, and this is 3 does not matter, and what is marginal rate of substitution in this case minus 1. We will let us change it little bit, let us put it here 3.25

just for example, because what is the marginal rate of substitution here, MRS by the definition that we have used is minus 0.75 why.

Student: (Refer Time: 04:32)

2, just wait I will come to that, why what is happening, increase in x is, why we are getting minus sign, because of course, when we have convexity what we will get. I think the better explanation for this why do we get this, what is the reason, why do we see this that to get 1 good you will have to give up the other good, both what we are assuming that both these items are good, means they give certain satisfaction or certain you know utility to the person, and what we want. We want this person to have the same level of utility, same level of satisfaction by consuming these one of these two bundles.

So, of course, when we are increasing the amount of 1 good to bring what will happen using this, if we use the monotonicity what will happen. More of 1 good and same of the other good what will happen. If more of 1 good what is happening let us see. From here you are moving here in this direction, here at the screen, its increasing from 2 its going to 3, and while the amount of second good is 4. Of course, here satisfaction would be higher using monotonicity.

So, to bring this person back to the original satisfaction level what you need to do is, this is delta x 1 and this is delta x 2, you will have to decrease the amount good 2. So, increase should always be accompanied by decrease in the other good, if both are the goods. If 1 is bad, remember the definition right from the beginning if 1 is bad then marginal rate of substitution would be positive, because to increase the amount of bad you will have to compensate that person by giving more of the other good.

So, in that case marginal rate of substitution would be positive, but here in this case it is negative, and what is this 0.75 to give a basically what we are talking about, that to get 1 more unit of good 1. So, here we have in denominator we have good 1 and changes 1 unit. How much change do we need in the second good, 4 minus 3.75; 3.25 and of course, I should put a minus sign here, and this is you get 0.75.

So, what is this, what is marginal rate of substitution.

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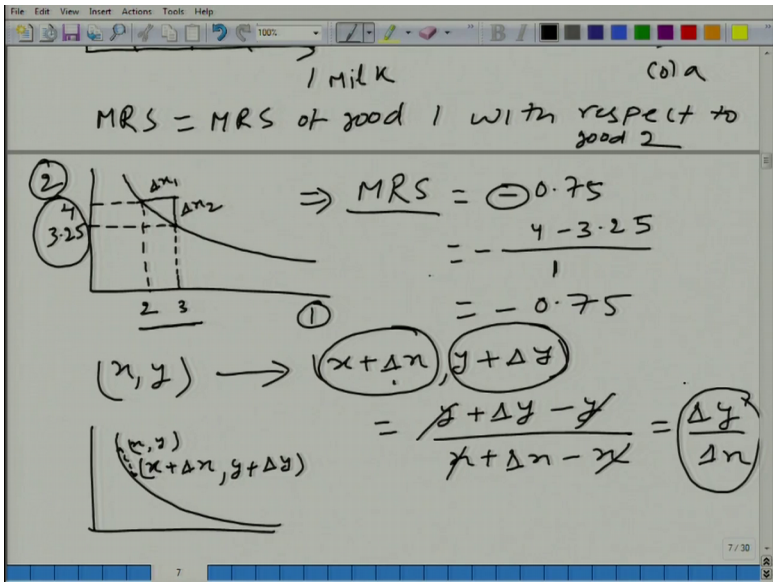

Marginal rate of substitution is nothing, but the slope of this indifference curve. So, what would be mathematically more sound rather than talking about 1 more unit of good 1, we should talk about very small unit of good 1, and with respect to get very little amount of good 1, how much the other person is willing to give up, the another good, but we have to measure in terms of per unit of good 1.

So, that is why in that case MRS is going to be, let us say in other word, let us see if we just do it mathematically, the original bundle is x y, and let us say what is happening from x y what we are having, change is x plus delta x and y plus delta y, and what would be the slope, what we are certain about that let us say, this is x y and this is x plus delta x comma y plus delta y, what would be the slope.

Student: (Refer Time: 08:50)

The slope is going to be y plus delta y minus y divided by x plus delta x minus x, delta x. Although I am not using it here; see what I have done I have increased the amount of good 1 and I also have increased the amount of good 2. Typically if delta x is positive delta y has to be negative. So, we will get here negative value, but in sometime in some books you would see, that MRS is given as a positive number, that only means that the author has introduced a negative sign here to convert the mrs into a positive number. So, it does not matter. Is it clear?