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NPTEL ONLINE COURSE
Discrete Mathematics
Logic
Rules of Inferences - Part 3
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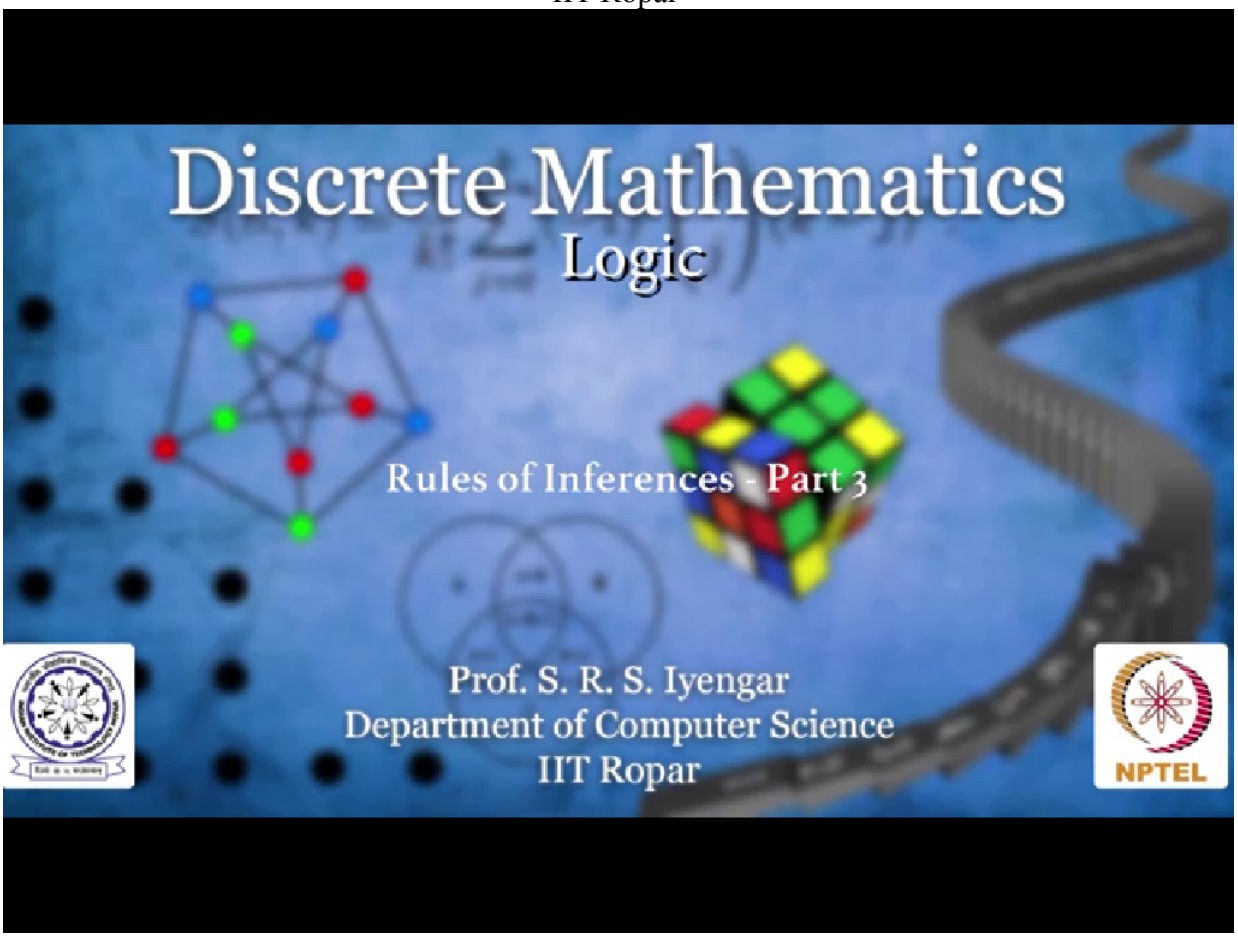
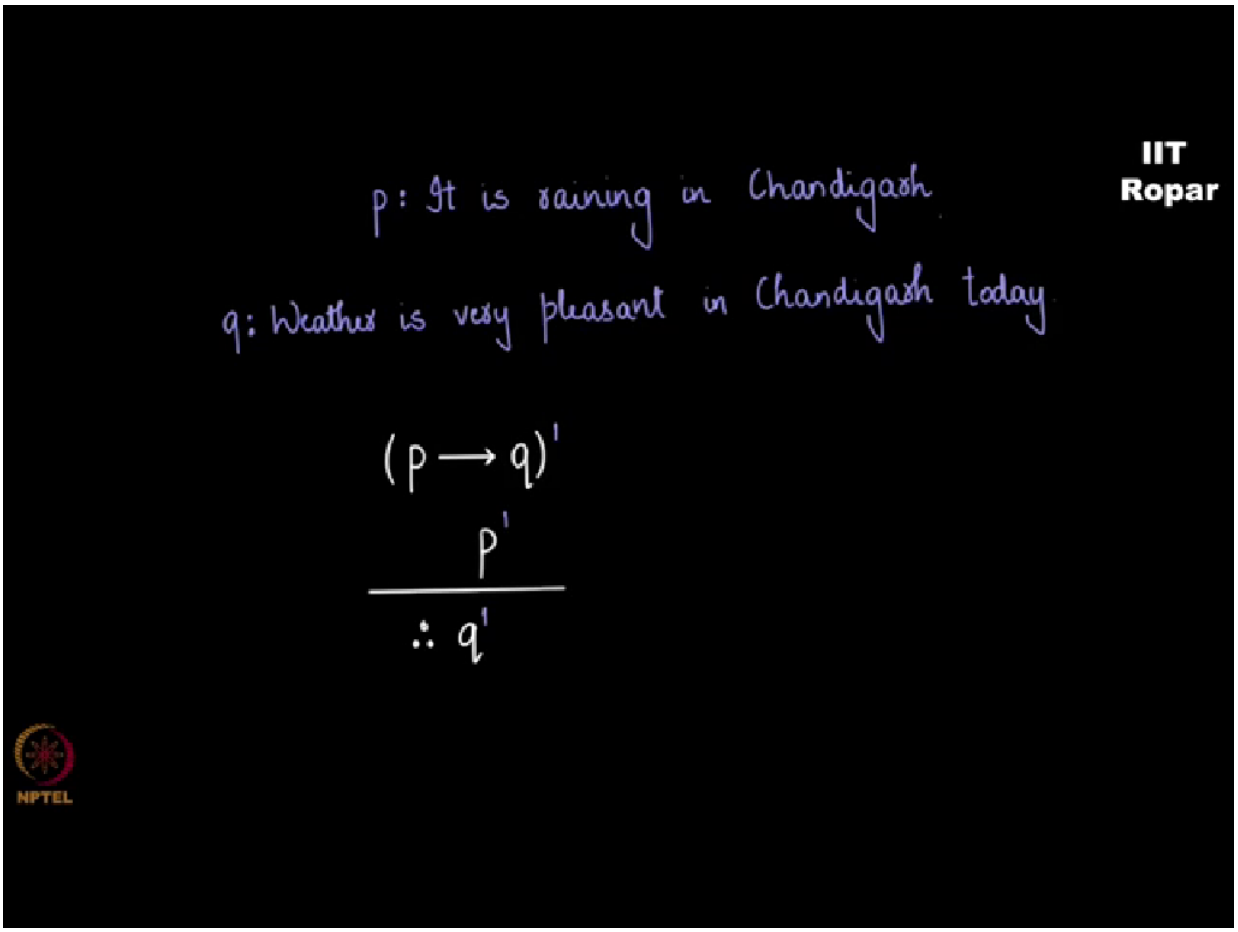


Look at the statement p. I stay in the state called Punjab in the country India, and we have this beautiful city right next to our institute IIT. The name of the city is Chandigarh. It is a very beautiful city.

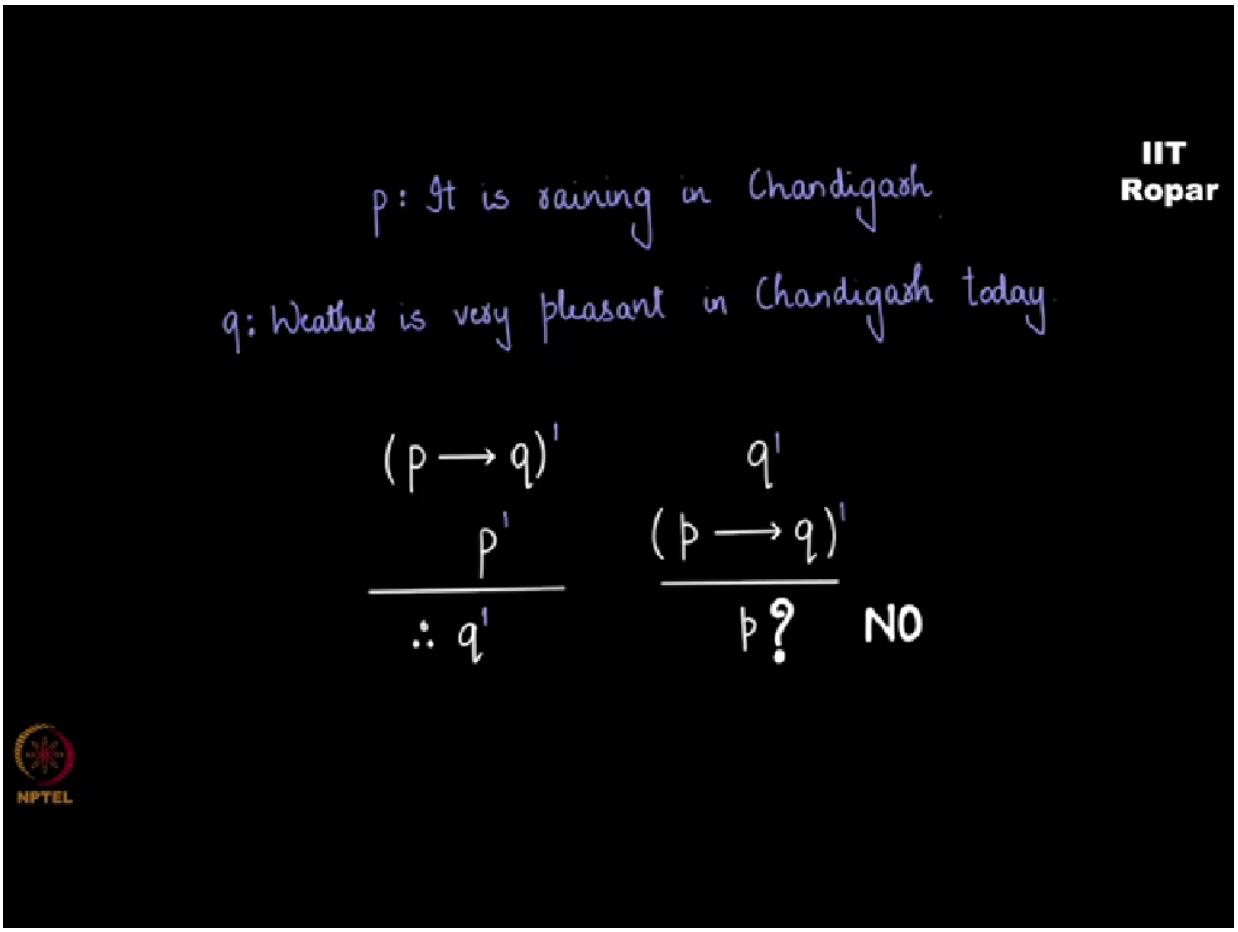
Now look at this. I made this statement p. It is raining in Chandigarh. When is p true? P is true if it is actually raining right now. Okay. Q is the weather in Chandigarh is very good today. What is p? P is it is raining in Chandigarh today. Q is weather is very pleasant in Chandigarh today.



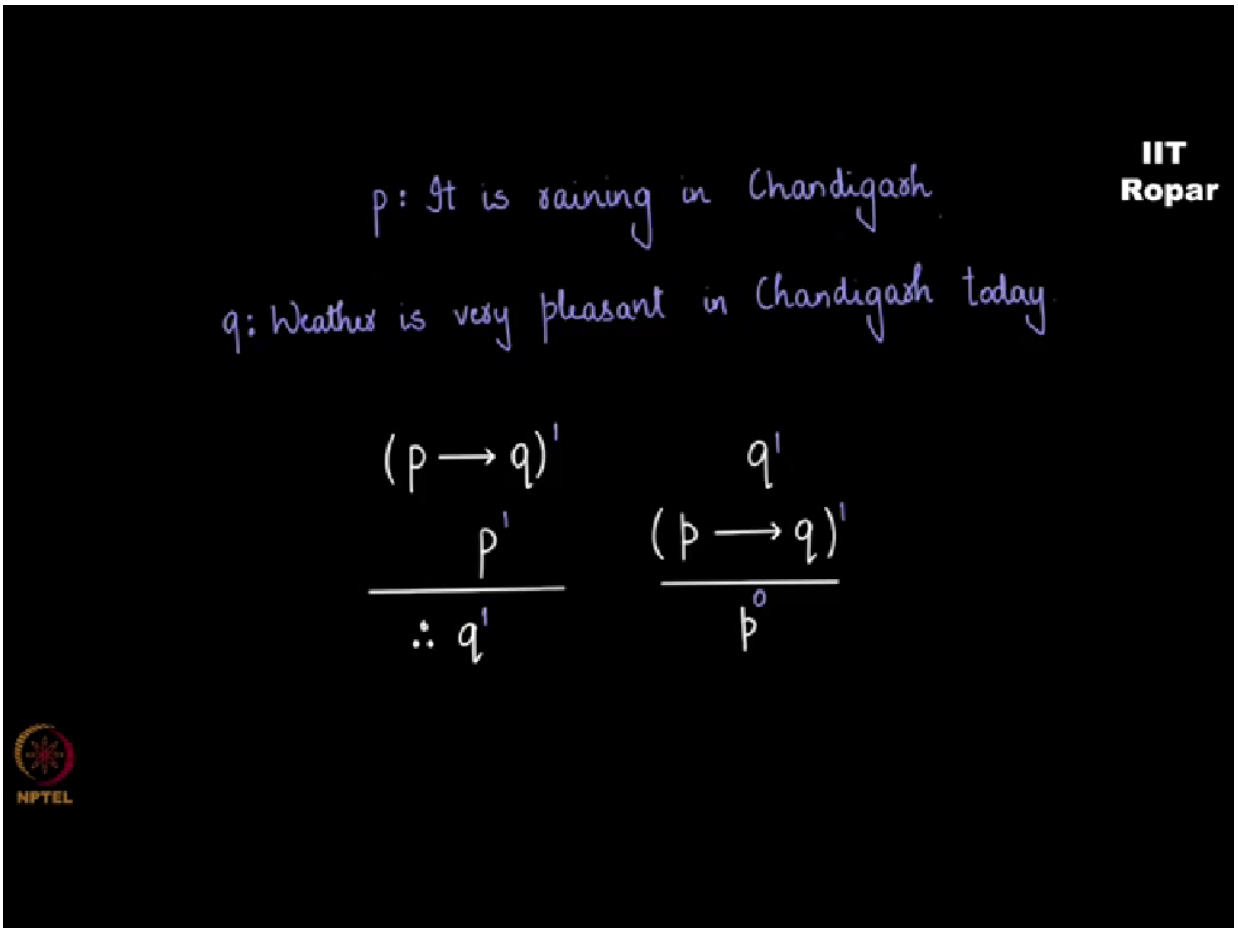
Now I say p implies q is true. What do I mean by that? I mean that if it is raining in Chandigarh today, it implies that weather is going to be nice today. It's going to be pleasant today. This is true. Right? You should not debate on how do you know if this is right, right? I am telling you it's always true in Chandigarh that whenever it rains, the weather becomes really pleasant and awesome.

Now p implies q and it did rain today. P is true. What can you conclude? Therefore, you can say q is true. The weather is indeed pleasant today.

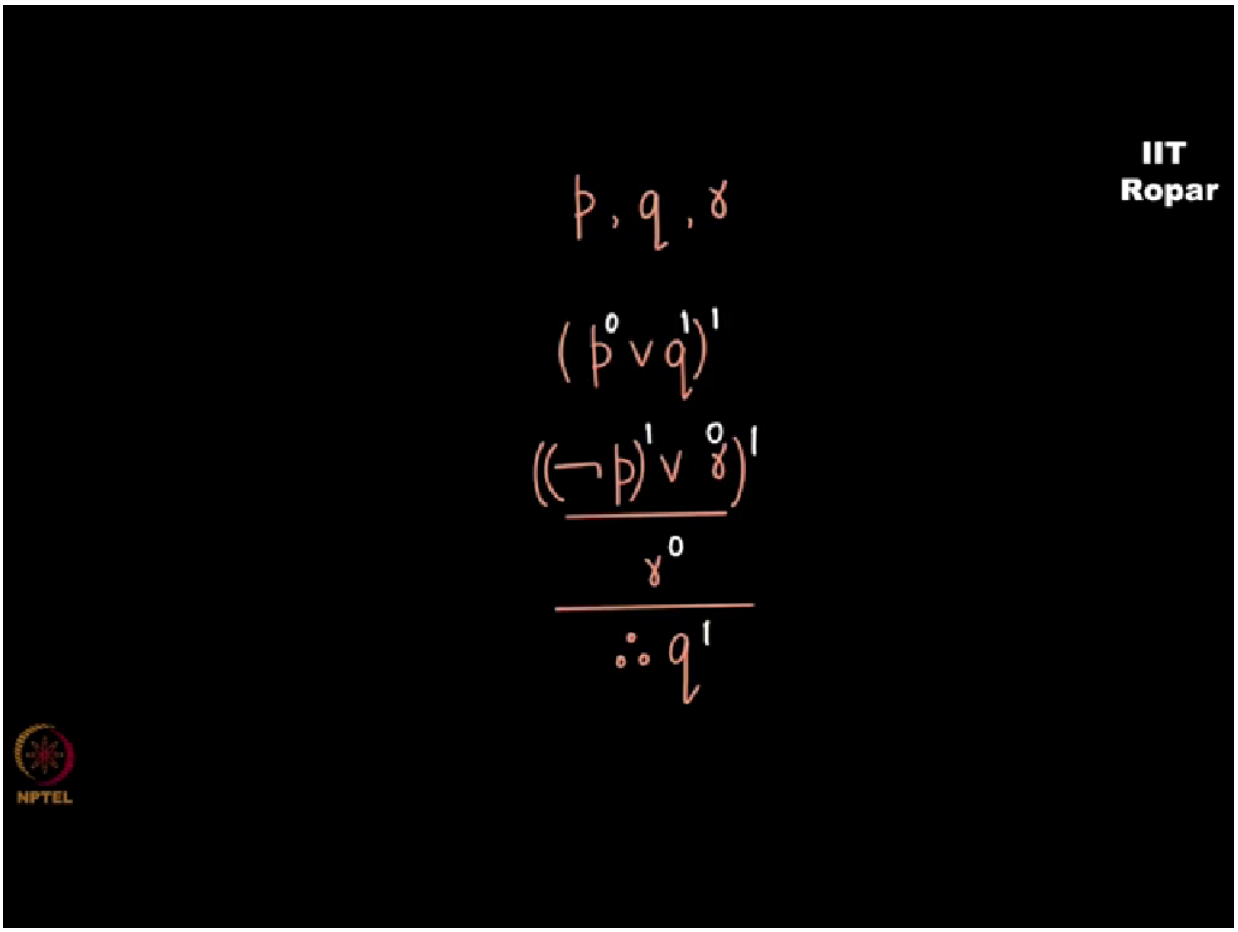
Now let us dissect this more. On some given day you go and you observe that q is true, and we all know that p implies q is true. Q is true means weather is good in Chandigarh today, and p implies q means when it rains in Chandigarh, the weather becomes pleasant in Chandigarh, q, p implies q.



Can you conclude that p is true here? Absolutely not. That is is because whenever the weather is pleasant, I never told you that pleasant weather means that day there was rain. Right? I never said that. I only said if it rains on a given day, on a particular day, that day the weather becomes very pleasant. Correct? So this is false. If q is true, p implies q is true. Therefore, p we cannot conclude, but if p is true, p implies q is true. Therefore, q we can conclude, not just in this case, in any case for that matter. Okay. I just revisited this problem although I solved it before. This is a good application of this problem and we will see more of such inference techniques in the forthcoming questions.



Let us look at this question. I will from now onwards not very much about the English statements. I will simply write the mathematical logical statements. It is given that statement p, statement q and statement r, these three statements are given and you are told that p OR q is true. You are also told that NOT p OR r is true. You might be wondering what am I doing? Treat this more like a mathematical puzzle. Okay. And NOT r is true meaning r is false. R is false. NOT p OR r is true. When r is false, right, this particular r becomes false and I say NOT p OR r is true. When this is false and this entire r thing is true, NOT p should be true, which means p should be false. So p is false here, but p OR q is true. When p is false, p OR q is true. Absolutely, one can conclude that without any question or doubt, q should be true.



Observe this problem carefully. If you didn't understand, this about it, watch this video once again. All that we did was every single line of this is true. What can you say? We can say that q is true.

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