

CP-module1_lecture9_editedShayon

Mon, 12/27 2:44PM 9:15

SUMMARY KEYWORDS

included, interval, intersection, endpoints, draw, overlap, venn diagram, boxy, lecture, round brackets, satisfied, unions, rounded, intersect, break, figure, numbers, brackets, circles, good

SPEAKERS

Catherine Pfaff

Welcome. In this lecture, we're going to talk about intersections of intervals. So here's the key question in what we're doing. So if I take 3, 7, and I intersect it with 4.5, 8, what do I end up getting? So let's first start by kind of drawing these on a number line. So this is kind of like an interval version of the Venn diagram. Okay, so let's kind of go through so, so interval Venn diagram, or interval version of the Venn diagram. So what do I do here? Okay, so the first thing I want to do is I want to start by writing down all endpoints. So I'm writing all endpoints.

Okay, so what are my endpoints? I have 3 and 7. 7 and I have from the other, I have 4.5, and I have 8. Okay, so I just kind of wrote down the endpoints 3, 7, 4.5 and 8. And then and then next up, what I want to do, it kind of helps to draw one interval above and one below. Okay? So um, so it helps to draw. We want one interval above, and one interval below. Okay, so we'll go ahead and do that. So we have on this one, we're going to put 3 above and then below, we're going to have 4.5 is going into 8, right? And these are rounded. So I don't include these. That's why I'm drawing the circles like that. Okay. And then we want to figure out where they overlap. So find where they overlap. And if we were instead doing right, in this circumstance, we're doing overlap because we're doing intersections, if we're doing unions, right, we want to find the combination. Okay, so this would actually be instead of that, so for unions, we'd be finding the combination. So combination for unions.

Okay, so let's go ahead and look at that. And so what's in the overlap, so we kind of kind of start here, and we look and this is not included. So the overlap is going to look like it's going to start here, without being included. When we get here, 7 is included in this and it's included in here, it's on this side, so we get something that looks like this. And we get that, which is the interval. So it's 4.5 on that side, and then it's 7 on this side. Okay. This is kind of our answer, but let's actually break that down. Okay, so what are we looking for? Okay, we're looking for numbers that are in both 3 and 7.

Numbers in both, right? We want to be in both this interval, sorry, we want to be both in the interval 3, 7, and in the interval 4.5, 8. Okay, so what's the first thing that we kind of know? Um, so I'm going to kind of draw a line here so that I can kind of break this down over here. So the first thing that we

do when we're breaking it down is I'm going to take, well I know everything that's between like strictly between these two is included. Okay? Um, so we definitely know everything between 4.5 and 7's in both.

So everything between 4.5 and 7 is in both, okay, um, so we just need to check the endpoints carefully. We'll go ahead and do that. So the first one that we want to look at, so let's look at 4.5. Okay, and for 4.5, um, we just check that it's, or it has to be in both of them. So 4.5. So first, we check whether it's in interval 3, 7. So 4.5 is in this interval 3, 7, right. And then the other one we have to check is 4.5, 8. And when we look at that, we know that it is not right? It's not in this interval, because it doesn't include its endpoints, right? Okay, so this tells me that it's not in the intersection, right? All it has to, only one of them has to fail and then it's not in the intersection. So one failed. So 4.5 is not in the intersection.

Okay, so now let's go ahead and do the next one. Okay, so 7. Okay, so the first let's check the interval 3, 7, it is in 3, 7, because 3, 7 includes the endpoints, it's going to inclusive because we got that that boxy, so this is in the boxy brackets. Okay, so that one's good. Um, it's also in this interval 4.5 to 8, right, because it's in between 4.5 and 7, right? So we know it is in 4.5, and 7, sorry, 4.5 and 8, it is in this interval, right? Because it's between it's greater than 4.5 and less than 8. Okay, so 7 is in, because it's in both. So both satisfied, so 7 is in. Okay, and then when we look back at here, this actually, this actually corresponds with what happens there. We just needed to figure out, we knew that everything between 4.5 and 7 was good, right? So that's why these are the end points. But then we had to check 4.5, it's not included, so we made that round. 7 was included, so we made it a box. Okay, so kind of one the key points in this lecture, is that, when you're looking at the intersection, things have to be in both of the intervals. And actually, in order to actually be included. We kind of have to remember that round brackets mean that something's not included and square means that it is and it can kind of help to make these Venn diagrams. So I hope that made some sense. And I'll see you in the next lecture.