

CP-module1_lecture1_editedShayon

📅 Mon, 12/27 2:44PM ⌚ 8:19

SUMMARY KEYWORDS

notation, integers, numbers, talk, negative, funny, fraction, meaning, decimals, write, circumstances, lecture, word, increase, blackboard, bold, decrease, shortening, color scheme, decimal expansion

SPEAKERS

Catherine Pfaff

Welcome. In this lecture, we're going to talk about the real numbers and the integers and their notation. So the first kind of notation I want to introduce, is that we will use so we use. And then this is a new, funny thing. It looks like an R, but it's gonna have two lines coming down. Okay, this is blackboard bold R, okay, and we use this notation for the collection or set. So for the collection, or set of all real numbers, of all, so these are real numbers, right, i.e., so this is everything on the number line, i.e., everything on the number line. So let's, and then we'll go ahead and draw that. So let's look at what we mean. Okay, and then again, this is the real numbers denoted with the two lines going down and otherwise an R, right, R for real numbers. Real numbers. Okay. Um, so we have kind of standard numbers, we have zero, we have one, and so on. We can also have decimals like 1.25 is allowed. The other thing so you know, decimals are allowed. Um, and so are actually what I would call like, funny numbers like pi. It's an important number, though, it just can't be written as a finite, you know, with finite decimal expansion. Okay?

We also can have negative, like we can have negative fractions. So I could do negative seven sixths, totally okay. I could also do E or minus E, right? This is this really funny number, which actually shows up a lot because of exponential growth. But it is a number, it goes on the number line, it's a real number. Okay. And then, so something that we say, or notation, so this is notation. I know that notation can sometimes in the beginning, feel a little overwhelming, but it's really helpful in shortening things, and often also for clarity, because sometimes words have more than one meaning. So sometimes we can give a nice concise notation, which, you know, pretty soon you'll get used to it and you'll know exactly what it means. And it's, it's very quick, and it's very clear. Okay, once you get used to it. So, here, this is something we might write. Okay, so here's something we might write, which is that when we write, when we write X, and then this funny E thing, and then our set of all real numbers, we what we mean is we mean, so what this notation means for us, is, X is some real number, okay? So X is some real number.

Okay. So that's what it means if I write X funny little E thing and then this blackboard bold R, is it I'm talking about a real number? Okay, I don't know what it is yet, I just know it's a real number. But now what if we instead we want to only allow intergers, okay. So what if we only want to allow integers? So what if only want to allow integers? Okay, um, such as, right, oh, I didn't want that to be green

actually. Let's just keep a color scheme going, for those who color has a lot of meaning for them and helps organize their thoughts, it's good to have kind of colors that do that. Okay, so if we only want to allow the integers such as, right, there's a lot of circumstances for this. Um, so such as well, let me write one and then we can, you know, there'll be more in the next lecture, but if we're looking at the increase of goods produced, right, you can't have, you can't have some fraction of a good, right, you either have one or you don't have one, you can't have a fraction of cases of a disease, you can't have a fraction of have a person, like there's a lot of things you can't have a fraction of. And so you want to only be talking about integers.

And there's more than one circumstances like that we'll talk about in the next lecture, where you actually want them to be like, oh, where you like, it's not just that you want them to be whole, but you can't actually allow negative. One of the particular examples of this is when you're talking about an increase, then a decrease can give you a negative number. So if you want to allow both an increase or decrease, you actually needed to talk about the intergers. Okay? So the answer is, so how do we do that? So here's our notation is we require that, you know, just like this was X is a real number, we have this notation X is in, okay, and you're ready, this one's gonna be a little bit different, I'm not just taking the first letter of the word, because they're doing that in German. That's where that comes from. Um, but this does mean X is an integer. Okay, so this is X is an integer, or in the set of all integers, but that's the same thing as saying that it's an integer, is an integer, single one, saying the set of all integers. So I wrote that, okay. So how does that kind of work? So the integers sit inside the real numbers, right? Integers are real numbers. So we can start actually with the real numbers, but we're only going to select certain ones. So we only select the ones that are whole numbers, but they can be negative whole numbers, so 0, 1, 2, 3, 4, 5, 6, and so on, it will keep on going infinitely, minus one, minus two, minus three, minus four, and so on. So this is the integers. Okay? Z, I know it's a little funny for the integers. But sometimes you have to live with the fact that English isn't the only language, or only language that people have done mathematics in. And so sometimes things will have names that don't have a lot of meaning to us, but they do to somebody from another country. But this is what they are, they can be positive, they can be negative, but they have to be whole numbers. These are going to show up actually quite a bit as the only possibilities for an answer, or an input or something like this, because you can only talk about a whole person or a whole car or a whole case of a disease or something. Okay, so there's circumstances where we want this and often right, if we're talking to an increase, the decrease would be negative or something like this. Okay, so I hope that made some sense, and that you aren't too intimidated by the notation because you will get used to it. And I will see you in the next lecture.