module1_lecture2

Mon, 12/27 3:42PM 12:02

SUMMARY KEYWORDS

votes, hilly, party, eligible voters, district, valley, plain, survey, algebraic expression, number, fraction, voters, variable, election, consists, clicker question, buys, swing, discrete values, differ

SPEAKERS

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Now let's consider an example from politics. And again to repeat what I said in the first lecture, the idea here in this module is to consider examples from a variety of contexts to get you used to the idea of how algebraic expressions, mathematical expressions, occur naturally in different areas of the social sciences. So here, in this example, from politics, let's consider two parties who are competing for an electoral seat. So these two parties, let's call them C and L. And they are competing in this in this constituency, which consists of three districts, which is Hilly, Valley and Plain. Of course, this is a caricature in real life, I don't know of any constituency which consists of Hilly, Valley and Plain, but you can think of constituencies which consists of lots of different areas, different localities, different districts, and which could differ in certain characteristics.

So what do Hilly, Valley, and Plain differ in? So here, we have Hilly, which has 1000 eligible voters, and 80% of them say that they will be voting for party c. So this is a stronghold for party C. On the other hand, Valley has 800 eligible voters 90% say that they will be voting for party L. So this here, Valley is a stronghold for party L. Now Plain, which consists of 1200 eligible voters is a swing district. Sometimes it has voted for party C, sometimes it has voted for party L. And so the main thing here is that in this particular election, which way will, will the swing district of Plain vote? So typically, what we do in such situations, what political parties, newspapers, and other organizations do in the sort of a situation, is to run a survey or a poll asking voters which way will they prefer to vote in the coming election? So suppose we consider that here is the survey which was run. And this finds that a fraction X of the voters in Plain say that they will vote for party C. So the, and the rest said that they would be voting for party L. So now, based on this data, right, how many votes does party C hope to get overall? So that's the main question that we want to address in this example.

So, so now let's again consider these three districts. So we have Hilly. This has 1000 eligible voters and a fraction, at 80% of them, so which is point eight, a fraction point eight, say that there will be voting for party C. So in Hilly, the number of votes that party C can hope to get is point eight times 1000 which is 800. So here 800 will be voting for party C and the remaining 200 will be voting for party L. What about Valley? remember Valley is a stronghold for party L. This has 800 voters. So 90% of them, so that's 90 over 100, which is point nine. So 90%, so point nine times 800, these are the number of voters who say that they will be voting for party L. So this is 720. So what that means is

that in Valley, 720 votes will go for party L, the remaining 80 will go for party C. And then comes the swing district of Plain. So this is Plain, it has 1200 voters. And we know that a certain fraction X, they say that they will be voting for C, and the remaining fraction, which is one minus X, they say that they will be voting for party L.

So how does that translate into actual number of votes that the two parties will get? So we'll use exactly the same way what we did in the previous cases in the Hilly and Valley. Right, so there are 1200 voters here, right. So if a fraction X say that they will be voting for C, so that means the total number of votes that C will get will be 1200 times X. So the number of votes that C hopes to get based on this survey in this swing district is 1200 times X. What about party L? Remember, party L is going to get the remaining fraction, that is one minus X of the votes. One minus X fraction of the votes that multiplied by the number of voters gives the total number of votes that party L can hope to get from this Plain district. Now, here, right, so if, if for example X is equal to point five, right, we can plug that in, then it'll be 1200 times point five, that's going to be equal to 600. Right? More generally, it's going to be 1200 times X. And here, X is the variable of interest. And here, this variable X can take any value between zero and one, right? If it is zero, if, if nobody says that they will be voting for party C, and it will be one, if everybody says that they will be voting for party C, right. And typically, in real life, it will be somewhere in between, it will be something like 0.5, 0.45, 0.57, right. So 0.57 would be mean that 57% of the voters in Plain say that they will be supporting party C. So this is a variable, which can take any number between zero and one. So again, to repeat myself, it can take values like 0.33, 0.34, 0.52, 0.67, right, so it can take any value between zero and one. So this is an example of what's called a continuous variable.

And this is different from what we did in the previous example, where we were looking at the number of stocks that Maya buys. The number of stocks that she buys of, say GameStop or Ford was 1, 2, 3, 4, right? So that was also variable, but it was a discrete variable, because it just took discrete values, right? She didn't buy 1.57 stocks of Ford, right. But here, X can take the value 0.57. So now let's come back to the main question that we're interested in, that how many votes does C hope to get based on the results of the survey? So where to look at the votes for C? And all we have to do is add up the votes that she gets in Hilly, that the party gets in Hilly, Valley and Plain. Right, so in Hilly, the party hopes to get 800 votes, in valley the party hopes to get 80 votes, and in Plain the party hopes to get 1200 votes, 1200X votes, right. So this gives the number of votes that the party can hope to get based on the results of the survey as 880 plus 1200x. So this is an algebraic expression, which denotes the number of votes that party C can hope to get in this election. And it depends on the value of this variable X, and if X is 0.5, it gives a particular value, if X is 0.6, it will give another different value.

So next I have a clicker question for you. And you can pause the video at this point and do the clicker question and then come back to the video, where we'll go over the solution to the clicker question. So hope you got the chance to do the clicker question. And hopefully it was not too hard, because it was exactly based on the same procedure that we did for party C. But now I've asked you how many votes does the other party, which is party L, hope to get based on the results of the survey. So we'll follow exactly the same procedure. So now for L, remember, in Hilly C gets 800 votes, so L will get the remaining. So that's 200. In Valley, which is a stronghold for L, the party gets 720. And in Plain, which

is a swing district, the party gets 1200 times one minus X. So if we add all of these up, that's the total number of votes that party L hopes to get in this election. And that's given by 920 plus 1200 times one minus X. And thus, the answer to the, the correct answer to the click question is A.