

Hello students, how are you all? I hope you all are fine. Today in this video we are going to discuss what is the third use of Z test. What is the third use of Z test? In the last video we discussed that we can check the proportion. We can also talk about the proportion while using Z test. Today in this video we will discuss that if we have two data given or two things we have data given by a company or something is being claimed what is the comparison between those two or what is the comparison between their proportion? We will talk about that. With example, you will understand it very well. And which formulas are there that will make this type of question easy? We will talk about all those things. So welcome to Gate Smashers. My name is Ankit Rodha. Without any delay, let's start. The first thing to see here is what the formulas are going to look like. In the formula, we will first find out P where P is the probability of success. We all know this. P is the probability of success. And Q is the probability of failure. First of all, we will find out P, that is, the probability of success. Now, it is obvious that two samples will be given and two data will be given. So we will have different probabilities of both. So P_1 and P_2 here will be the probability of success of sample A and sample B. That is, what is the probability of success in sample A and sample B? That is P_1 and P_2 . N_1 and N_2 will be the total sample of B and this will be the sample of A. That is, how many numbers of samples are being chosen in A and how many numbers of samples are being chosen in B. So it is obvious that we are talking about two data. So their sample size and their probability or favorable or total are going to be different. So we will find out this first. After that, we will go to Z calculated. That is, we will put Z test. P_1 and P_2 , I have just told you. The difference between the two. We have also read the value of probability of success, N failure and N_1 and N_2 . Formulas are in front of you. Let's discuss a question so that it will be clear with love. See, as the statement of the question is in front of you. It says, in a random sample of 800 persons from Delhi and 600, in a random sample of 800 persons from Delhi, 600 persons from Delhi and 600 are found to be non-veg. What data do we have in this example? In Delhi, I have 800 out of 800 people who like to eat non-veg food or who are non-veg. The first data. And from Gurgaon, 700 like non-veg out of 1200. Out of every 1200 people in Gurgaon, 700 people like non-veg food or are non-veg. It has given two data on an average. If we choose 800 people as a sample, then 600 of them will be non-veg. In Gurgaon, I have the data of Delhi and here I have shown the data of Gurgaon. Two different cities' data is being shown here. Two different samples are being taken out. Then it says, do these data indicate that this is the significant difference in the front, if the level of significance is 5%? It says, is there any difference in this data? If there is a difference, then check and show where the level of significance is 5%. Level of significance in the sense, we are talking about the percentage of error that we saw in the hypothesis. If you are not able to understand the level of significance, then continue the previous 2-3 videos and read the hypothesis. You will be clear. Everything is in this playlist. Now, let's understand this data in a good way. Now, if I put my term and condition, my formulas, it says, Let's assume that the data of Delhi is N_1 . How many people were chosen for the total sample? 800 people. N_2 , that is, how many people were chosen for the total sample of Gurgaon? 1200 people. Now, from N_1 , that is, from Delhi, how many people are such who are non-vegetarians? How many people are such? 600. That is, its probability of success. Now, probability of success means that non-vegetarians are from Delhi. So, 600 divided by 800. This will be 0s divided by 0s. 2 3s, 2 4s. So, that is, 3 by 4. I got the answer. Now, if we talk about P_2 . How many people are non-vegetarians here? 700 out of 1200. So, how much did I get the answer? 7 by 12. That is, $N_1 P_2$, $N_1 N_2 P_1$ and $N_2 P_2$. That is, all these things came. Now, let's talk about the main probability of success. Which is representing the whole data. So, the main probability of success is P_1 in N_1 and N_2 . That is, the multiply of these two. Which will automatically come out to be 600. Plus the multiply of these two. Which will automatically come out to be 700. Divided by N_1 plus N_2 . That is, 800 plus 1200. That is, 2000. See, what is this formula? What is the formula? What is this total value? Total favorable cases and total outcomes. How? How many people are non-vegetarians? 7 plus 6 is 1300 out of 2000. So, that is the answer. So, put it in this. Or understand it directly. It is the same thing. So, this is 13 divided by. Sorry. If there is a disturbance in the audio, then ignore it a little. Right? 20 in 13 by. So, this is the value of my P. That is, the value of success. The probability of success is there. So, it is very easy to find out the failure. So, how much value of Q will I get? Minus it from 1. Which is equal to 7 by 20. Now, we have to apply only the Z test. Let's see the value of Z. What does Z say? P_1 minus P_2 . That is, 3 by 4 minus 7 by 12. Square root of PQ in 1 by. P. PQ in 1 by. So, the value that we are given, we will change the formula here. This is not 1 by PQ. This is only PQ. Okay? So, we have the value of PQ. 20 in 13 by. And, multiplied by 20 in 7 by. In 1 by, N_1 . How

much is N_1 ? 800. Plus, in 1 by, N_2 . That is, 1200. So, this is the value. How much was it in 7 by? It was 12. 12, I got LCM. This is 3, 3 is 9. Minus 7. Whole divided by 20. It came out here. That is, 1 by 20. This is 7. 7 into 13. 91. And, as we are taking LCM, it is 12, 2000. 2400. And, here, it will come. The value is 24. And, 3 and 2 is 5. That is, 4 by 55. 2400 came in the root. So, after calculating all this, we have the answer. As it is, 7.65. Okay? Calculation is your part. 7.65. I have the answer. It is coming out. What does this mean? That the Z calculated, that is, the value of Z calculated came to me. 7.65. And, the value of Z tabulated is 5% of level of significance. 1.96. I provided you the table. Otherwise, I will show it. So, here, the calculated value is greater than our tabulated value. This means that the null hypothesis is rejected. That is, H_0 is rejected. And, H_0 is rejected means that the claim that is being done, that is being told that is there any difference between them, what are we taking? If I mention H_0 here clearly, then, here, according to this statement, the meaning of H_0 will be that P_1 is equal to P_2 . That there is no much difference in the probability of both. It will work a little. That 600 out of 800 people are non-veg, or 700 out of 1200 people are non-veg. That was it. And, H_1 , the alternate hypothesis said that there is a difference between them. There is a difference in the probability of this data. There is a difference in the probability of non-veg. So, if our null hypothesis is rejected, it means that the alternate hypothesis will be corrected. It will be accepted that yes, there is a difference in the data. Let's understand one more small question. I am showing you the question on the screen. It says that 500 people like juice out of 1000. Out of 1000, 500 people are liking juice. Right? And then it says that 700 people like juice out of 1200. So, we have data of two cities. In one city, 500 people like it. In the other, 700 people like it. Out of these, is there any difference in this data? Where 1% of level of significance is there. So, let's do it quickly. The value of N_1 is 1000. The value of N_2 is 1200. So, how much will P_1 get? 500 divided by 1000. That is 1 by 2. How much will P_2 get? 700 divided by this. 7 by 12. So, what is the probability of success? $N_1 P_1$ means this into this. Again, 500 plus $N_2 P_2$ which is equal to 700 divided by total data N_1 plus N_2 means 2200. So, I got the answer. 1200 divided by 1000. 2200 which is equal to 6 divided by 11. So, if the probability of success is 6 by 11, what will be the failure? Minus from 1. Do the same Z test. Z test says P_1 minus P_2 means 1 by 2 minus 7 by 12 whole divided by PQ. PQ is 6 by 11 into 5 by 11. 1 by N_1 plus 1 by N_2 . That is 1 by 1000 plus 1 by 1200. So, after solving all the data, the value of Z calculated is minus 3.98. And what is the level of significance? 1%. If I have 1% level of significance, then the value of Z calculated is 1.65. If 1% level of significance is there, you can see from the table, where the mod is placed. But here the value is coming as minus 3.98. And what does this mean? It can be done between minus 1.65 and 1.65. Is it doing it? This means that the null hypothesis is rejected again. The same thing will happen that yes, there is a difference between both the data. So, this was our third important use of the Z test. Where we are going to have the last video of this Z test. And in the next video, we will discuss about the new topic. So, I hope you will like this third use of Z test. You must have understood it. Like every time, this time also, you will get the file link in the description. Keep all the formulas of hypothesis with you. For revision in the exam time, quickly within one or two hours, you have to go through all the formulas once. So, let's meet in the next video. We will talk about a new topic. Have a good day to all of you. If you have got something to learn in the video, then you will definitely like and share the video. Let's meet in the next video, same time, same place, next day. Have a good day to all of you. Bye-bye. Bye.