Hello students, how are you all? I hope you all are fine. Today in this video we are going to see the first use of the Z test. What is the first use of the Z test? I have a total of maximum 3, most of the use comes out. Look, the question can come of any type, but I am telling you the most famous uses so that the hypothesis is a little understandable in understanding you. That is, the idea will come that what type of question can come out with us. So welcome to gate smashers, my name is Ankit Rodha, without any delay, let's start. The first use of the Z test is to find out the number of success. Now the meaning of saying number of success is that if you have a question like this in the exam, a coin was thrown and so many heads came, is it possible? Test the hypothesis. Is it possible? Has any mischief been done in the coin? Is the coin biased or unbiased? A die was thrown, find the probability or check that the probability of getting an even number is so much or the number is coming out of 400 times that 4 times. And 300 times we got an even number. What is possible? Is there any mischief in the dice? Is the die your unbiased or some other kind of die? When questions of this type come out, we check there whether the number of success is correct or not. This is the first use. So without any delay, let's start. First of all, what can we put a direct formula here? We can put a direct formula here. Look, it is the same formula. I am telling you the topics by going around. If you come to the topics, then put this formula exactly and get the answer straight. If you do different types of questions on one formula, especially in the test, and you also know this thing that hypothesis is the weakest topic for you so far because it is totally the part of the stat. So we will understand it very well, we will understand it very lovingly. It says that the value of Z will be what will happen here. The formula of Z will come out to be X minus NP divided by square root of NP. You will say that sir, I put the same formula by going around, took out the mean, took out the standard deviation and put the value of the last one. I put the same formula, I am making it a little easy, I will make it easy in every video. Where? What do I have? Observed success. That which will be given to us. What was observed? According to the question. Or what is given depending on the situation. N is the number of time or number of sample. P is the probability of success and Q is the probability of failure. Simple type of formula. Did not understand. The table will be used the same as we did in the last video. Here, first of all, let's understand the question, it will be very clear. The question is on your screen. Let's understand the words one by one and start writing the values. You have the statement of the question. Now the question is, it says that a coin was tossed 500 times. 500 times a coin was tossed. 500 times a coin was tossed. And head turns up 400 times. Out of which 400 times it was seen that the head is coming. 400 times it was seen that the head is coming. Understand the statement of the question. Test the hypothesis that the coin is unbiased. Is this coin unbiased? Check this. Whose question came out? Z test. 500 times are being thrown. There is a sample above 30. Okay, do you understand? We have talked about the number of successes. Is the coin correct? Is the coin unbiased? Is it biased? Sorry. Right? So here I can say this directly. The value of N is 500. And the thing that is being observed is that my head is coming 400 times. The probability of the head coming is 1 by 2. That is the probability of success. And the probability of the head not coming is 1 by 2. Let's check. The value of Z is Z is equal to X that is 400 minus Np. 500 into 1 by 2. Which is equal to what? 250. Divide by. Square root of N. N is equal to 500. P is equal to 1 by 2. Q is equal to 1 by 2. So the answer is 150 divided by. This will be done. Divide by 4. 4 1s. 4 2s 8. 2 0s. 4 5s. So I got 125. Okay. After solving this, we are getting the answer near about. 13.41. 13.41. So we have to solve this. So we have to solve this. So we have to solve this. So we have to solve this. So we have to solve this. So we have to solve this. 13.41. 10 10s are 100. 12. Near about exact. 13.41. We got the answer. Now check this that this is the calculated value of my Z. Okay. It is like the same mode. Calculated value. Now if I see the value in the table. Here, what is the level of significance? Here the level of significance is not given. So by default, we will take it to 0.05. Now in the last video, I showed you the table. There the value of 0.05 was 2 tailed. Now I will show you the third one. Now here the value of 0.05 is 0.05. So by default, we will take it to 0.05. Now this is the last thing. So we will take this. see the value of 2 tailed is 1.96 that means our tabulated value is smaller than this or calculated value is bigger than this this means that null hypothesis is rejected what is the direct meaning of rejecting null hypothesis? what did we assume in null hypothesis case? what did we assume H node? that our coin is not biased but it is biased that means H0 will be rejected H1 will be accepted that means coin is biased there is some problem in coin let's understand in next question next question says in 100 throws 6 faces die 100 times a die is thrown even if even points appear 80 times even number is not taken as 80 times so 80 times even number is coming out of 100 would you say that die is fair of 5% of the level of significance? at 5% if level

of significance is 5% then is this die correct? is there any problem in this? let's check first of all here if I select null hypothesis what will be my null hypothesis? number of even number you can say and number of odd here I will check statement again what statement is saying? we would say that die is fair of 5% so what will our null hypothesis say? yes these two are equal right? what will our alternate hypothesis say? these two are not equal now we have to check test first of all how many pieces of sample was taken? or how many die was thrown? 100 100 die was thrown 80 I am getting even success and failure in one die coming even and coming odd what happens? P that is 1 by 2 Q that is 1 by 2 P is 1 by 2 and Q is 1 by 2 coming even and coming odd 3 are even and 3 are odd so now let's find value of Z Z is here X which is observed 80 minus N into P 100 into 1 by 2 that is 50 divided by square root of N P Q how much is N? 100 P is 1 by 2 Q is 1 by 2 so this answer is 30 divided by 100 by 4 25 and what is the root of 25? how much is 5? 6 so calculated value of Z we have 6 and if I check value of Z at 0.05 now we have 5% of level of significance now we have checked 5% of level of significance now we have checked how much is it? 1.96 so calculated value has increased from your tabulated value so null hypothesis will be rejected means yes there is something in the die in the coin there is something in the die it is not a fair die so I hope you understood its first use understood the formula knowing that I focused on recorded lessons in the test specially for these type of questions in the next video a new formula will be there in the next video we will see a new formula new use I hope you liked the video so like and subscribe and share see you in the next video same time same place next day have a good day to all of you bye bye