**Problem Statement**

In one state, 52% of the voters are Republicans, and 48% are Democrats. In a second state, 47% of the voters are Republicans, and 53% are Democrats. Suppose a simple random sample of 100 voters is surveyed from each state. What is the probability that the survey will show a greater percentage of Republican voters in the second state than in the first state?

**Solution:-**

1. P1= Republicans voters in the first state= 52%=0.52
2. P2=Republicans voters in the second state=47%=0.47
3. Sample from first state n1=100
4. Sample from second state n2=100
5. n1p1=100\*0.52=52
6. n2p2=100\*0.47=47
7. Mean difference p1 and p2=(0.52-0.47)=0.05
8. Standard deviation :

σ = sqrt{ [ P1(1 - P1) / n1 ] + [ P2(1 - P2) / n2 ] }

σ = sqrt{ [ (0.52)(0.48) / 100 ] + [ (0.47)(0.53) / 100 ] }

σ =sqrt (0.002496 + 0.002491) = sqrt(0.004987) = 0.0706

1. Probability of P1 < P2 i.e. P1-P2 < 0
2. Hence the mean should be 0 (X)

µ=0.05

SD=0.0706

Hence Zscore would be

Z=X- µ/SD

Z= 0-0.05/0.0706= -0.7082

11. The probability of the zscore being less than -0.7082 and less would be 0.024

P(z<-0.7082)= lookup of negative zscore table comes up to 0.24.

**Ans: 0.24**