**Problem 1: Blood glucose levels for obese patients have a mean of 100 with a standard deviation of 15. A researcher thinks that a diet high in raw cornstarch will have a positive effect on blood glucose levels. A sample of 36 patients who have tried the raw cornstarch diet have a mean glucose level of 108. Test the hypothesis that the raw cornstarch had an effect or not**

H0 : Raw CornStractch has effect on Glucose Level

H1 : Raw CornStractch Does not have effect effect on Glucose Level

Sample Size (n) = 36 > 30

Population sigma = 15

Population Mean = 100

Sample Mean = 108 Since Sample size > 30 and population standard deviation is given hence Z test will be applicable

Z score = sample mean – population mean/standard deviation population \* sqrt(sample size)

= 108- 100/15 \* sqrt(36) = 3.2

Let Alpha = 0.05

*Z*0.05​=1.96 (two tailed)

Since 3.2 is greater than 1.96 hence we reject the Null Hypothesis and assume there is an effect

#let :- #P1 = Proportion of Republican voters in the first state

#P2 = Proportion of Republican voters in the second state

#P\_1 = Proportion of Republican voters in the sample from the first state

#P\_2 = Proportion of Republican voters in the sample from the second state.

#N1 = The number of voters sampled from the first state N1 = 100

#N2=The number of voters sampled from the second state N2 = 100

P1 = 0.52

#Q1=(1 - P1), the proportion on non republican voters in first state

Q1 = 0.48 P2 = 0.47

#Q2=(1 - P2), the proportion on non republican voters in second state Q2 = 0.53

#The mean of the difference in sample proportions or the expected value E[P\_1- P\_2]

mu =P1 - P2

#The standard deviation of the difference (Std)

std = math.sqrt(((P1 \* Q1 ) / N1) + ((P2 \* Q2) /N2)) print("Mu : ",mu,"Std : ",std)

#This problem requires us to find the probability that P\_1 is less than P\_2

#This is equivalent to finding the probability that P\_1 - P\_2 < 0 x = 0

#To find this probability, we need to transform the random variable (P\_1 - P\_ 2) into a z-score.

#Z= Z\_score(P\_1,P\_2)

#That transformation appears below. Z = (x - mu)/std print("Z\_score(P\_1,P\_2):",Z)

#From Z table we find that the probability of a z-score being -0.7082 or less is 0.24.

**The probability that the survey will show a greater percentage of Republican voters in the second state than in the first state is 0.24.**

**Problem 3. You take the SAT and score 1100. The mean score for the SAT is 1026 and the standard deviation is 209. # How well did you score on the test compared to the average test taker?**

#The z score tells you how many standard deviations from the mean your score i s #

My score =x

x = 1100

#Population Mean =mu

mu = 1026

#population standard deviation =sd

sd = 209

z = ( x - mu)/sd = 0.35

print("Z Score : ",z) print('The above calculation shows that my score is 0.35 standard deviations a bove the mean')