**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.**

**ANS**:

Since the population standard deviation is known, Z-test is used.

H\_0:\mu=100*H*0​:*μ*=100

H\_1:\mu\ne100*H*1​:*μ*=100

Let \alpha=0.05*α*=0.05

Z=\frac{\bar{X}-\mu}{\frac{\sigma}{\sqrt{n}}}*Z*=*n*​*σ*​*X*ˉ−*μ*​

Z\_{0.05}=1.96*Z*0.05​=1.96 (two tailed)

Z=\frac{140-100}{\frac{15}{\sqrt{30}}}=14.61*Z*=30​15​140−100​=14.61

Since Z=14.61>1.96*Z*=14.61>1.96 , we reject the null hypothesis and conclude that the raw cornstart had an effect at 5% level of significance.

**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 are 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?**

**ANS:**

Make sure the sample size is big enough to model differences with a normal population. Because n1P1 = 100 \* 0.52 = 52, n1(1 - P1) = 100 \* 0.48 = 48, n2P2 = 100 \* 0.47 = 47, and n2(1 - P2) = 100 \* 0.53 = 53 are each greater than 10, the sample size is large enough.

Find the mean of the difference in sample proportions: E(p1 - p2) = P1 - P2 = 0.52 - 0.47 = 0.05.

Find the standard deviation of the difference.

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

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

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

Find the probability. This problem requires us to find the probability that p1 is less than p2. This is equivalent to finding the probability that p1 - p2 is less than zero. To find this probability, we need to transform the random variable (p1 - p2) into a z-score. That transformation appears below.

z p1 - p2 = (x - μ p1 - p2 ) / σd = = (0 - 0.05)/0.0706 = -0.7082

Using Stat Trek's Normal Distribution Calculator, we find that the probability of a z-score being -0.7082 or less is 0.24.

Therefore, 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.’

**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?**

**ANS:**

**Z = (x- μ)/ σ**

**1100-1026/209 = 0.354**

This means that your score was .354 standard deviations above the mean.

From z table we can say that 63.8% people fall below 1100 SAT score.