**Topics: Confidence Intervals**

1. For each of the following statements, indicate whether it is True/False. If false, explain why.
2. The sample size of the survey should at least be a fixed percentage of the population size in order to produce representative results.

:= **False**, Because the sample size is determined through statistical principles and depends on the specific characteristics of the study not on the fixed percentage of the sample size.

1. The sampling frame is a list of every item that appears in a survey sample, including those that did not respond to questions.

:  **= False,** Sampling frame is a list of potential sampling units not the list of units that actually participated in the survey.

1. Larger surveys convey a more accurate impression of the population than smaller surveys.

:= **TRUE,** because a larger survey provides more accurate and reliable estimation of population than the smaller ,it mainly helps in handling the error.

1. *PC Magazine* asked all of its readers to participate in a survey of their satisfaction with different brands of electronics. In the 2004 survey, which was included in an issue of the magazine that year, more than 9000 readers rated the products on a scale from 1 to 10. The magazine reported that the average rating assigned by 225 readers to a Kodak compact digital camera was 7.5. For this product, identify the following:
2. The population = total people that all readers of PC Magazine.
3. The parameter of interest = average rating of Kodak compact digitak camera[7.5]
4. The sampling frame = total numbers of readers who attended the survey[More than 9000]
5. The sample size = readers who given the ratings = 225
6. The sampling design = Random sampling ,because sampel data is not given.
7. Any potential sources of bias or other problems with the survey or sample

:= there is one bias which we can easly identify that is Random selection.

1. For each of the following statements, indicate whether it is True/False. If false, explain why.
2. If the 95% confidence interval for the average purchase of customers at a department store is $50 to $110, then $100 is a plausible value for the population mean at this level of confidence.

:= **TRUE.** $100 plausible value falls within the average of $50 to $110.

1. If the 95% confidence interval for the number of moviegoers who purchase concessions is 30% to 45%, this means that fewer than half of all moviegoers purchase concessions.

:= the above statement is **FALSE,** because here they have not mentioned the sample data so it can lie anywhere in the given interval.

1. The 95% confidence interval for *μ* only applies if the sample data are nearly normally distributed.

:= **TRUE,** because sampling distribution of the sampel mean becomes approximately normal as the sample size increase independently.

1. What are the chances that ?
2. ¼
3. ½
4. ¾
5. 1

Answer = B.1/2

1. In January 2005, a company that monitors Internet traffic (WebSideStory) reported that its sampling revealed that the Mozilla Firefox browser launched in 2004 had grabbed a 4.6% share of the market.
2. If the sample were based on 2,000 users, could Microsoft conclude that Mozilla has a less than 5% share of the market?

:= this is alternative hypothesis where Mozilla firefox is less than 5%.

*Z = p-po/^po(1-po)/n*

*P = sampel proportion 4.6 or 0.046%*

*Po = claimed proportion 5 or 0.05%*

*N = sampel size[2000]*

*Z=0.046-0.05/0.05(1-0.05)/2000*

*Z =-0.004/0.05(0.95)/2000*

*Z= -0.83.*

1. WebSideStory claims that its sample includes all the daily Internet users. If that’s the case, then can Microsoft conclude that Mozilla has a less than 5% share of the market?

:= NO Microsoft cant able to conclude that Mozilla has a less than 5% share of the market . because it has not provided the sampling method and size of datapresent.

1. A book publisher monitors the size of shipments of its textbooks to university bookstores. For a sample of texts used at various schools, the 95% confidence interval for the size of the shipment was 250 ± 45 books. Which, if any, of the following interpretations of this interval are correct?
2. All shipments are between 205 and 295 books.

:= Incorrect.the given interval is between205-295 are 95% confidence interval not in 100% confidence interval.

1. 95% of shipments are between 205 and 295 books.

:= FALSE , we cant predict based upon the given interval.

1. The procedure that produced this interval generates ranges that hold the population mean for 95% of samples.

:= TRUE ,because it gives only sampel mean.

1. If we get another sample, then we can be 95% sure that the mean of this second sample is between 205 and 295.

:=FALSE = CI is about population mean not about sampel mean.

1. We can be 95% confident that the range 160 to 340 holds the population mean.

:= TRUE. Because it has wider range however it falls with in the limit.

1. Which is shorter: a 95% *z*-interval or a 95% *t*-interval for *μ* if we know that σ =s?
2. The z-interval is shorter
3. The t-interval is shorter
4. Both are equal
5. We cannot say

A:= The z-interval is shorter

Questions 8 and 9 are based on the following: To prepare a report on the economy, analysts need to estimate the percentage of businesses that plan to hire additional employees in the next 60 days.

1. How many randomly selected employers (minimum number) must we contact in order to guarantee a margin of error of no more than 4% (at 95% confidence)?
2. 600
3. 400
4. 550
5. 1000

:= Z = 1.96 # Z-score for a 95% confidence level

p = 0.5 # Assumed proportion for maximum required sample size

E = 0.04 # Margin of error

required\_sample\_size = math.ceil((Z\*\*2 \* p \* (1 - p)) / E\*\*2)

print(f"Minimum sample size: {required\_sample\_size}")

A:600 = Minimum sample size: 601

1. Suppose we want the above margin of error to be based on a 98% confidence level. What sample size (minimum) must we now use?
2. 1000
3. 757
4. 848
5. 543

Z = 2.33 = Z score of 98% confidence interval

P = 0.5

E = 0.04, margin of error

required\_sample\_size = math.ceil((Z\*\*2 \* p \* (1 - p)) / E\*\*2)

Minimum sample size: 848 = option C