**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.

Ans :- True

The survey should have a specific sample size, a fixed percentage of population that helps to analyse the data well to give more accurate results/model.

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

Ans :- False

The sample should contain only those items that have responded because the items with no response adds no value the analysis and just increases the size of data.

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

Ans :- True

More the size of sample, it captures maximum patterns thats helps to build an accurate mode

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
3. The parameter of interest
4. The sampling frame
5. The sample size
6. The sampling design
7. Any potential sources of bias or other problems with the survey or sample

Ans :- A. Total no of reader :- 9000

B. Rating of the camera :- 7.5 (mean, sample)

C. All reader of the issue where survey is done.

D. 225

E. Voluntary Response

F. It is possible that only those who were particulary pleased or only displeased with product participated in the survey which can makes result unreliable.

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.

Ans :- True.

Confidence intervals indentify the values for the population parameter that are consistent with the observed sample.

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.

Ans :- False.

We have consider value out of the range that is more than 95% confidence interval.

1. The 95% Confidence-Interval for *μ* only applies if the sample data are nearly normally distributed.

Ans :- False.

The central limit theorem states that the distribution of sample means approximates a normal distribution as the sample size gets larger, regardless of the population's distribution.

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

Ans :- B. ½ = 0.5

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?
3. 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?

Ans :- Set+3 Que 5 Ans .ipynb.

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.

Ans :- Incorrect

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

Ans :- Incorrect

Interval does not defined for individual shipments.

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

Ans :- Correct

95% of intervals created in such way that contain the true population 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.

Ans :- Incorrect

Intervals does not describe mean of the another sample.

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

Ans :- Incorrect

Intervals does not always corresponds to 95% confidence intervals.

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

Ans :- 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

Ans :- Assume , Phat = 0.5

Z = 1.96

Margin of error = Z \* sqrt(Phat\*(1 - Phat)/n)

0.04 = 1.96 \* sqrt((0.5 \* 0.5)/n)

n = ((1.96)2 \* 0.5 \* 0.5 )/ (0.04)2 = 0.9604 / 0.0016 = 600.25 = Option A

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

Ans :- Assume , Phat = 0.5

Z = 2.326

Margin of error = Z \* sqrt(Phat\*(1 - Phat)/n)

0.04 = 2.326 \* sqrt((0.5\*0.5)/n)

n = ((2.326)2 \* 0.5 \* 0.5) / (0.04)2 = 1.3525 / 0.0016 = 845.35 = Option C