**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: False. (It is important to have an adequate sample size,there is no fixed percentage requirement for the sample size in relation to the population size. Sample size depends on various factors such as the desired level of precision , the variability of the population, and the research objectives)

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, ( It includes in the survey sample including those that respond to the questions.

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

Ans: True.

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

Ans: 9000

1. The parameter of interest

Ans: Not Mention

1. The sampling frame

Ans: 9000

1. The sample size

Ans: 225

1. The sampling design

Ans: Not Mention

1. Any potential sources of bias or other problems with the survey or sample

Ans: Selection of readers and issue while the survey.

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.

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. 45% is greater than 50%, it means that more than half of all moviegoers purchase concessions. However, we cannot say for certain whether fewer or more than half of all moviegoers purchase concessions, as the true proportion could be anywhere within the given range.

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

Ans: True

If the sample size is small or if there are outliers or skewness in the data, then the normality assumption may not hold. In such cases, alternative methods such

as the t-distribution or non-parametric methods may be used to construct confidence intervals.

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

Ans: D.1 Because the expected value of sample mean is equal to the population mean.

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?

Ans: No, Microsoft cannot rectify on sample of 2000 users.

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?

Ans: Yes, with daily internet users the microsoft can conclude that the Mozilla has a less than 5% share of the market.

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: Incoreect, not all the shipments are between 205 to 295 books.

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

Ans: Correct,the 95% of shipments are between 205 to 295 books

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

Ans: Correct, the procedure produced this interval generates ranges that hold the population mean of 95% of samples.

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: Correct,95% sure that the mean of this second sample is between 205 and 295.

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

Ans: Incorrect, We can’t be 95% confident that the range 160 to 340 holds the population mean.

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: A.The z-interval is shorter ,because the t-critical is greater than z-critical.

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: 600.

E=4%=0.04

C=95%=0.95

pˆ=unknown

sample size , n=[zα/2]2pˆqˆ/E2 =[zα/2]2 pˆ(1-pˆ)/E2

zα/2=1.96

Therefore , n=1.962×0.25/0.042= 600

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: D.543

E=5%=0.05

C=98%=0.98

pˆ-unknown here we use pˆ=0.5 because it will result in largest possible.

sample size, n= ((zα/2)2 pˆ(1-pˆ))/E2

here confidence level 1-α =0.98