**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 (Result depends on sample size. Sample size should have at least 30 observations.)

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 (Sampling frame is a list of target population from which sample is selected)

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.:** Readers of Magazine = 9000

1. The parameter of interest

**Ans.:** Rating of camera (7.5)

1. The sampling frame

**Ans.:** All readers of issue where the survey was included.

1. The sample size

**Ans.:** 225

1. The sampling design

**Ans.:** Voluntary response

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

**Ans.:** Possibility is that, those who were particularly pleased or only who didn’t like the product participated in the survey which can make result biased.

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

We are not confirmed about that. We have to consider value more than 95% confidence level.

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

**Ans.:** False

We should have sample size usually at least larger than 30 for many cases, the central limit theorem implies that the sampling distribution is normal regardless of the data.

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

**Ans.:** B.: 1/2

There is 50% chances that the sample mean is greater than 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.:** X= 0.046 , n=2000, Z95 = 1.96 , q =0.954

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.:** In the above statement, we have data on the entire population and the sample value accurately reflects the population number. Thus we can conclude that the share is less than 5%.

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 (given interval is for 95% confidence not for 100%)

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

**Ans.:** Incorrect (interval does not describe individual shipment.)

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

**Ans.:** Correct.

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 ( The interval does not describe the mean of another sample)

1. We can be 95% confident that the range 160 to 340 holds the population mean.
2. **Ans.:** Incorrect (Interval does not corresponds to a 95% CI)
3. Which is shorter: a 95% *z*-interval or a 95% *t*-interval for *μ* if we know that σ =s?
4. The z-interval is shorter
5. The t-interval is shorter
6. Both are equal
7. We cannot say

**Ans.:** Option A

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.:** Option A

N=no. of employee

Assume p=0.5 and q=0.

Margin of errors = 0.04

Z0.95 =1.96

Margin of error= Z\* √(p\*q/n)

0.04 = 1.96 \* √(0.5\*0.5/n)

n =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.:**

Z = 2.326

0.04 = 2.326\*\*√(0.5\*0.5/n)

n = 845.35