**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**

The results depend on the size of the sample.

The 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**

The sampling frame is a list of every item in the target population from which the sample is Selected

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

**Ans: True**

Large sample size will result in less standard deviation compared to small sample size.

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 frames
5. The sample sizes
6. The sampling designs
7. Any potential sources of bias or other problems with the survey or sample

**Ans:**

1. The population is 9000 readers out of all readers
2. The parameter of interest i.e., Mean = 7.5
3. Sample frames: All the readers of the issue included = 9000
4. The sample size = 225
5. Volunteer Responds
6. It is possible that who were displaced with the participate in the survey which can make the results unreliable.
7. For each of the following statements, indicate whether it is True/False. If false, explain why.
8. 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**

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

**Ans: False**

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

**Ans: 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?

**Ans:** Given values: X = 4.6% = 0.046, n = 2000, Z = 1.96, q = 0.954

95% Confidence interval for the proportion Mozilla is = 0.0551

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 this case we have the data on 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**

The interval of (205,295) is for 95% confidence not for 100%

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

**Ans: Incorrect**

The interval does not decide the individual shipments.

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

**Ans: Correct**

The 95% interval created in this way contain true population

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 other sample

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

**Ans: Incorrect**

The interval does not correspond to 95% confidence interval.

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**

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:** Given, n=number of employees, p = 0.5, q = 0.5, error = 0.4, Z = 1.96

n = 1.96 \* 1.96 \* 0.5 \* 0.5 / 0.4 \* 0.4

= 0.9604/0.0016

= 600

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:**

n = 2.326 \* 2.326 \* 0.5 \* 0.5 / 0.4 \* 0.4

= 1.3525 / 0.0016

= 845.35

Option **C.**