**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

It is essential to determine an appropriate sample size to ensure that the results are representative of the population.

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 the target population for the survey, so it is the list of items from the population

1. Larger surveys convey a more accurate impression of the population than smaller surveys. - TRUE
2. *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:
3. The population - 9000
4. The parameter of interest – 7.5
5. The sampling frame- 9000
6. The sample size- 225
7. The sampling design- Voluntary participation of 225 readers out of 9000 population
8. Any potential sources of bias or other problems with the survey or sample- Voluntary participation, readers who chose not to participate, variable ratings among the readers who chose to participate.
9. For each of the following statements, indicate whether it is True/False. If false, explain why.
10. 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
11. 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. - FALSE

The 95% confidence interval of 30% to 45% means that we are 95% confident that the true proportion of moviegoers who purchase concessions falls within this range.

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

The 95% confidence interval for the population mean is generally applicable even if the sample data are not exactly normally distributed.

1. What are the chances that ?
2. ¼
3. ½
4. ¾
5. 1
6. 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.
7. If the sample were based on 2,000 users, could Microsoft conclude that Mozilla has a less than 5% share of the market?

A sample of 2,000 is relatively small compared to the total number of internet users, so the 4.6% result has a large margin of error. Microsoft would need a larger sample size to confidently say Mozilla's share is under 5%.

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?

If WebSideStory's sample includes all daily internet users, then yes, Microsoft could conclude Mozilla's market share is under 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.
3. 95% of shipments are between 205 and 295 books.
4. The procedure that produced this interval generates ranges that hold the population mean for 95% of samples.
5. If we get another sample, then we can be 95% sure that the mean of this second sample is between 205 and 295.
6. We can be 95% confident that the range 160 to 340 holds the population mean.
7. Which is shorter: a 95% *z*-interval or a 95% *t*-interval for *μ* if we know that σ =s?
8. The z-interval is shorter
9. The t-interval is shorter
10. Both are equal
11. We cannot say

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

Sample size = Z2 x p x (1-p)

E2

Where -

Z is z-score (at 95% confidence level, it is 1.96)

p is estimated proportions (0.5)

E is margin of error

Sample size = 1.962 x 0.5 x (1-0.5)

0.042

= 600.25

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

Margin of error = Z x p x (1-p)

n

= 2.326 x 0.5 (1 - 0.5)

600

= 0.0475

Sample size = Z2 x p x (1-p)

E2

= 2.3262 x 0.5 x (1-0.5)

0.042

= 848.265