Topics: Confidence Intervals

1. For each of the following statements, indicate whether it is True/False. If false, explain why.

    I. 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 sample size doesn't have to be fixed percentage of the population size for good results. Its is more important to choose a sample in fair way to represent the whole.

    II. 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 things we can choose from for our survey. It is usually doesn't include things that didn't answer the survey.

    III. Larger surveys convey a more accurate impression of the population than smaller surveys.
    Ans: True : Actually larger surveys give a better idea of what the whole group thinks but after a certain point making aa survey larger might not make the results much better. How well the survey is made also matter a lot.

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:

    A. The population
    Ans: All the reader of PC Magazine

    B. The parameter of interest
    Ans : The parameter of interest could be average satisfaction rating given by all the reader of kodak compact digital things.

    C. The sampling frame
    Ans : The sampling frame would be the list of all PC Magazine readers who were invited to participate in the survey.

    D. The sample size
    Ans: The sample size is 225 readers who rated the Kodak compact digital camera.

E. The sampling design
Ans: The information provided doesn't explicitly mention the sampling design used, but since more than 9000 readers participated in the survey and 225 readers rated the Kodak compact digital camera, it's possible that a random or systematic sampling approach was used.

F. Any potential sources of bias or other problems with the survey or sample
Ans: Some reader may not answered the survey (non response bias) , people might not given a truthful ratings (response bias), how they picked people]could be biased (Sampling method bias).

3. For each of the following statements, indicate whether it is True/False. If false, explain why.

I. 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 : if the 95% confidence interval for the average purchase of customers at the department store is $50 to $110 this mean that we are 95% confident that the true population mean falls within the range. Since $100 falls within the interval it is indeed a plausible value for the population mean at this level of confidence.

II. 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: In this case, we can be 95% confident that the proportion of moviegoers who purchase concessions falls between 30% and 45%, but it doesn't tell us if it's less than half or not, as half would be 50%. The true proportion could be anywhere within that range.

III. The 95% Confidence-Interval for μ only applies if the sample data are nearly normally distributed.
Ans: False: Confidence interval depends on many factor not just (μ)

4. What are the chances that $\overline{X} > \mu$?

A. ¼
B. ½
C. ¾
D. 1
(Full information is not provided so not having any idea about these question)

5. 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.

    I. 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, if the sample was taken from 2,000 users and showed Mozilla had a 4.6% share, there is a margin of error, and the actual market share could be anywhere between 3.68% and 5.52%. So, Microsoft cannot say for sure that Mozilla's share is less than 5%.

    II. 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 : If WebSideStory's sample includes everyone who uses the internet daily, then Microsoft can trust the 4.6% number as an accurate representation of Mozilla's share. They don't need to worry about errors in this case. So, if that's true, Mozilla indeed has a 4.6% share.

6. 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?

    A. All shipments are between 205 and 295 books.
    Ans: Incorrect

    B. 95% of shipments are between 205 and 295 books.
    Ans: Incorrect

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

    D. 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

    E. We can be 95% confident that the range 160 to 340 holds the population mean.
    Ans: Incorrect

7. Which is shorter: a 95% z-interval or a 95% t-interval for μ if we know that $\sigma = s$?

    A. The z-interval is shorter

B. The t-interval is shorter
C. Both are equal
D. 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.

8. 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)?

A. 600
B. 400
C. 550
D. 1000

Ans : A. 600

9. Suppose we want the above margin of error to be based on a 98% confidence level. What sample size (minimum) must we now use?

A. 1000
B. 757
C. 848
D. 543

Ans: C. 848