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;

TRUE, IF the same size is too low, higher is the change of being wrong and lower is the value of confidence.

    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, A list of all the elements in the population from which the sample is drawn. Frame is needed so that everyone in the population is identified so they will have annual opportunity for selection as a subject.

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

ANS;

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:

    A. The population
    ANS;
    P=X/N=225/9000=0.025
    B. The parameter of interest
    ANS;
    Sample size, average, scale
    C. The sampling frame
    ANS;
    9000
    D. The sample size
    ANS;
    225
    E. The sampling design
    ANS;
    Voluntary response
    F. Any potential sources of bias or other problems with the survey or sample

ANS;

We can say that only the readers who felt the user is bad, left most of the reviews than the users who really liked the product.
So, we can say that the reviews of 7.5 rating might be un-reliable.

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

   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, the confidence interval tells you the probability of the population mean falling with-in the interval, but doesn't give you any more information on the distribution.

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

   ANS;

   TRUE

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

   A. ¼
   B. ½
   C. ¾
   D. 1

   ANS; D

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, as when it comes to internet users, 2000 users are not adequate for the calculation.

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;

Yes, this will eliminate the bias of upgrading of a particular browser, as we are measuring in daily basis.

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;

FALSE →The interval is for 95%, not 100%

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

ANS;

FALSE→95% shows the size of the shipment, not individual shipments.

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

ANS;

TRUE→95% confidence interval holds the population mean

   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;

FALSE→ one interval cannot determine the mean of another sample

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

ANS;

FALSE→ this range doesn't fall under the 95% confidence interval

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

   A. The z-interval is shorter
   B. The t-interval is shorter
   C. Both are equal
   D. We cannot say

ANS; 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.

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

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