# 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 (results depend on the size(n) of the sample)

   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 (sampling frame is a list of all the items in the target population)

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

        ANS: True (Large sample = less standard deviation)

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: All readers of *PC Magazine*

   D. The sample size

      ANS: 225

   E. The sampling design

      ANS: Random

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

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.

    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.

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

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

    A.  ¼
    B.  ½
    C.  ¾
    D.  1

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?

<span style="color:red">Since in the question we are not given with the level of significance so we assume it to be 5%. **Now, at 5% level of significance the z table gives a critical value of -1.96 for left-tailed test.**</span>

<span style="color:red">Since the value of our test statistics is more than the critical value of z, so we have *insufficient evidence to reject our null hypothesi*s as it will not fall in the rejection region.</span>

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?

<span style="color:red">ANS: Yes</span>

<span style="color:red">We are given that WebSideStory claims that its sample includes all the daily Internet users. This means that the 4.6% share of the market represents the whole population.</span>

<span style="color:red">**Hence, we can conclude that Mozilla has a less than 5% share of the market.**</span>

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.

   <span style="color:red">ANS: Incorrect (confidence interval is 95%)</span>

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

   <span style="color:red">ANS: Incorrect</span>

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

   <span style="color:red">ANS: Correct</span>

   D. If we get another sample, then we can be 95% sure that the mean of this second sample is between 205 and 295.

   <span style="color:red">ANS: Incorrect</span>

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

   <span style="color:red">ANS: Incorrect</span>

7. Which is shorter: a 95% *z*-interval or a 95% *t*-interval for $\mu$ 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(because it tell us difference between mean of distribution and data points in standard deviation .)

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

    **then n=25^2 or 625.**
       **Choose 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