**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.

* True. There should always be a sample size for the result of the presentation survey, also the sample size must be a fixed percentage of the total percentage size of the survey.

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. The sampling frame is which always responds to the question which refers to the list of items.

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

* True. The larger the survey, the bigger the data, this will help us get more information and be more accurate impression of the population.

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- All the readers
3. The parameter of interest- Average rating
4. The sampling frame- Readers who have rated the products ( approx 9000)
5. The sample size- 225
6. The sampling design- Stratified sample, as the 225 random samples are taken from 9000 readers who have given rating and then divided and then samples were taken.
7. Any potential sources of bias or other problems with the survey or sample- Selection of the readers, selection of the issue which will continue the survey.
8. For each of the following statements, indicate whether it is True/False. If false, explain why.
9. 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.

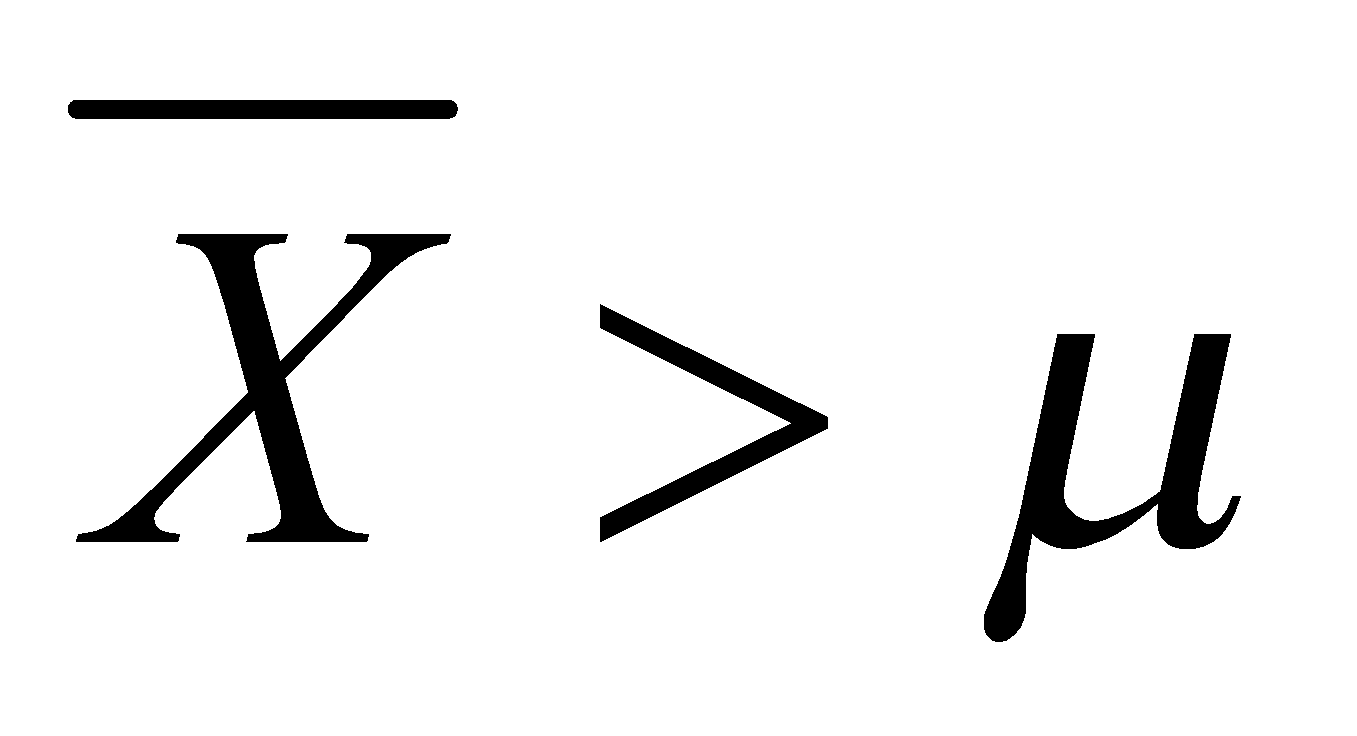
* True. As the average purchase is between 50-110, 100 falls between these values, it is a plausible value.

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.

-True. As only 30-45% of movie goers purchases concession, this is less than 50%, this shows that less than half of all moviegoers purchase concessions.

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

- False. To get confidence intervals, the distribution of the data does not need to be normal or nearly normal.

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

* (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?

* No.

Let us assume that the population share of the market by Mozilla firefox is = P

this means Null Hypothesis H0 >=5% and Alternate Hypothesis H1 <5%

The sample proportion P is grabbed by Mozilla in year 2004 = 4.6%

n= sample of users= 2000, hence, the z-test statistics is -0.821.

Since the degree of significance is not explicitly stated in the question or mentioned at all, we can infer that it is 5%. Now, the z table will yield the left-tailed test a critical value of -1.96 with a level of significance of 5%.Since the test statics value now exceeds the critical value of z, the null hypothesis cannot be ruled out because it will not fall within the rejection part or area.So, it follows that Mozilla has a market percentage of at least 5% and probably more.

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?

* Yes.

Reason being, sample analysis becomes population analysis when all everyday internet users are included, making the information 100% accurate.

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.- Not correct. As we can only be 95% sure about the shipments which can be between 205 and 295.
3. 95% of shipments are between 205 and 295 books.- Not correct.
4. The procedure that produced this interval generates ranges that hold the population mean for 95% of samples.- Correct. As this does provide a data value from the population with the range of 95%
5. If we get another sample, then we can be 95% sure that the mean of this second sample is between 205 and 295.- Not correct.
6. We can be 95% confident that the range 160 to 340 holds the population mean.- Not correct.
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

* Option 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

* Option A (600)

95% of confidence, therefore α = 0.05. M = 0.04

z = Z value of 1- α/2

= z of 0.975 = 1.96

Let p = 0.5

M = z\* sqrt(p\*(1-p)/n)

n = (1.96\*0.5/0.04) ^2

n = 600.2 ~ 600

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

* Option C (848)

95% of confidence, therefore α = 0.02. M = 0.04,

z = Z value of 1 – α/2

= z of 0.99 = 2.327

Let p = 0.5

M = z\*sqrt(p\*(1-p)/n)

n = (2.327\*0.5/0.04) ^2

n = 846 ~848