**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.**

Ans= false, the sample size can take any random variable ,also sample size of 30 is considered large but not enough to compute results.

1. **The sampling frame is a list of every item that appears in a survey sample, including those that did not respond to questions.**

Ans= **TRUE** The population is generic and the sampling frame is a specific list of all items in the population. Hence the sampling frame includes those that did not respond to questions.

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

Ans= True, because conviction is based on prediction and a larger set of samples would give us the accurate impression of characteristics of the population, which would make our prediction accurate.

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**
3. **The parameter of interest**
4. **The sampling frame**
5. **The sample size**
6. **The sampling design**
7. **Any potential sources of bias or other problems with the survey or sample**

Ans=

1. All the readers of PC Magazine=9000
2. Rating of the camera (7.5)
3. All readers of the issue where the survey was included.
4. 225
5. Voluntary response
6. It is possible that only those who were particularly pleased or only who are displeased with the product participated in the survey which can makes the results unreliable.
7. **For each of the following statements, indicate whether it is True/False. If false, explain why.**
8. **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.**

Answer= True

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.**

Answer: True

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

Ans= False ,with large enough sample , the central limit theorem implies a normal sampling distribution of data regardless of the distribution of data.

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

**Ans= D 1**

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?**

## Answer= Yes, we can conclude that Mozilla has a less than 5% share of the market.

## null hypothesis

## : P>5%

## alternate hypothesis: p<5%

## test statistics >1.64 accept H0

## test statistics <1.64 accept H1

## z=(0.046-0.05)/(np.sqrt((0.05\*(1-0.05))/2000))

=-0.82

pvalue=1-stats.norm.cdf(abs(z))

pvalue= 0.205

Here test statistics <1.64 i.e .20<1.64

## so accept H1 we can conclude that Mozilla has a less than 5% share of the market.

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?**

**Ans= We can conclude that Mozilla has a less than 5% share of the market.**

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.**

Ans= Incorrect 95% of the time the size of the shipment will be around 250+/- 45 books.

1. **95% of shipments are between 205 and 295 books.**

Ans= Correct, 95% shipments are between 205 and 295 books because 95% for only these shipment is 250+/- 45 books.

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

Ans= correct since the procedure tells us that only books from 205 -295 hold the confidence interval of 95%

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

Ans= Correct

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

Ans: Incorrect because sample cannot tell us the mean of the population.

1. **Which is shorter: a 95% *z*-interval or a 95% *t*-interval for *μ* if we know that σ =s?**
2. **The z-interval is shorter**
3. **The t-interval is shorter**
4. **Both are equal**
5. **We cannot say**

Ans= A. because it tells 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.**

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**

Ans= n=no of employers, Assume p^=0.5, q^=0.5 margin of error=0.04

For 95% confidence interval, the critical value z=1.96

ME=Z\*sqrt((p^\*q^)/n)

0.04=1.96\*sqrt((0.5\*0.5)/n)

N= (1.962\*0.5\*0.5)/0.042=0.9604/0.0016=**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**

Ans= C **848**