**CBA: Solutions to Practice Problem Set 4**

**Topics: Sampling, Confidence Intervals for Mean**

1. True/False.
2. **False**. The results depend on the absolute size (*n*) of the sample, not the size as a percentage of the population. The only time we are concerned about the sample size as a percentage of the population size is when the sample accounts for a significant part of the population (more than 10%), in which case, the sample cannot be assumed to have been drawn from an “infinite” population and the statistics need to be adjusted for that. In this course, we always assume that the sample size is never as big enough as this. However, this is a little bit of an “extra” that is good to know.
3. **False**. The sampling frame is a list of all the items in the target population from which the sample in selected. Therefore it includes all of the items in a particular sample, and more.
4. **True**. A bigger sample (larger n) results in shorter interval estimates for any confidence level (say 95%) because the standard error of the sampling distribution reduces (s/sqrt(n)). So the statement is true, so long as the survey is representative i.e. the sample is drawn randomly and is unbiased.
5. PC Magazine survey.
6. Population: Users of Kodak camera
7. Parameter: Mean rating of a Kodak compact digital camera
8. Sampling frame: All readers of the issue where the survey was included
9. Sample size: 225 (for the camera, others did not rate it)
10. Sample design: Voluntary response
11. Other issues: One might suspect that only those who were particularly pleased or displeased with their camera participated in the survey. So the results may not be reliable.
12. Book Shipments – Interpretation of 95% Confidence Interval:
13. **Incorrect**. The interval describes, with 95% confidence, the location of the average shipment size *μ*, not the sizes of individual shipments
14. **Incorrect**. The interval does not describe individual shipments
15. **Correct**. 95% of intervals created in this fashion contain the true population mean.
16. **Incorrect**. The interval does not describe the mean of another sample.
17. **Incorrect**. The interval does not correspond to a 95% confidence level.

4. Given that sample size=1200, sample standard deviation=14 and sample average=43 , 1-alpha=0.99.In order to find the 99% confidence interval for the average daily number of unwanted e-mail message, we have

t1-α,n-1 = t10.995,1199 = 2.579936

s/sqrt(n)= 14(sqrt(1200) =0.4041452

(xbar ± t1-α,n-1 \* (s/sqrt(n))) = (43-2.579936\*0.4041452, 43+2.579936\*0.4041452)

= (41.96, 44.04)

5. Given that DMOE= 10 units, 1-alpha= 0.90 , s=50 and n=?

We know

n>= (s\* Z1-α / DMOE)2

= (50 \* Z0.90 /10)2

= (50 \* 1.64/10)2

= 67.24

= 67.

Therefore the minimum required sample for estimating the average number of designer shirts sold per day is 67.