Assignment – X

**(Parameter Estimation & Hypothesis testing)**

**Deadline: 8/11/19**

1. A sample of 10 television tubes produced by a company showed a mean lifetime of 1200h and a standard deviation of 100h. Estimate (a) the mean and (b) the standard deviation of the population of all television tubes produced by this company.
2. The mean and standard deviation of the maximum loads supported by 60 cables are given by 11.09 tons and 0.73 ton, respectively. Find the (a) 95 % and (b) 99% confidence limits for the mean of maximum loads of all cables produced by the company.

|  |  |
| --- | --- |
| **Maximum load**  **(short tons)** | **Number of cables** |
| 9.3 - 9.7 | 2 |
| 9.8 - 10.2 | 5 |
| 10.3 - 10.7 | 12 |
| 10.8 - 11.2 | 17 |
| 11.3 - 11.7 | 14 |
| 11.8 - 12.2 | 6 |
| 12.3 - 12.7 | 3 |
| 12.8 - 13.2 | 1 |
| **Total** | **60** |

1. For the **7** samples of **5** housefly wing lengths & for milk yields, compute 95% confidence limits to the parametric mean for each sample and for the total sample based on 35 items. Base the standard errors of the means on the parametric standard deviations of these populations:

Housefly wing lengths **σ = 3.90**

Milk yields **σ = 11.1597**

Record how many in each of the four classes of confidence limits (wing lengths & milk yields, n = 5 & n = 35) were correct – i.e., contained the parametric mean of the population?

1. For **200** samples of ***n* = 5** and ***n* = 35** wing lengths, compute 95% and 99% confidence limits of the parametric mean employing the parametric standard error of the mean.

Out of 200 confidence intervals, how many contain the parametric mean of the population in the two cases for two sample sizes?

Do you see any effect of increasing the sample size?

1. A manufacturer claimed that at least 95% of the equipment that she supplied to a factory conformed to specifications. An examination of a sample of 200 pieces of equipment revealed that 18 were faulty. Test her claim at significance levels of (a) 0.01 and (b) 0.05.
2. A coin that is tossed 8 times comes up heads seven times. Can we reject the hypothesis that the coin is fair at significance levels of (a) 0.05 and (b) 0.1? Use a two tailed and one tailed test?

7. A tire manufacturer claims that the mean mileage for their premium brand tire is 60,000 miles. A consumer organization doubts the claim and decides to test it.

(a) State the null and alternate hypotheses and test whether the manufacturer’s claim is true at0.01 significance level.

(b) Compute the probability of committing type II error when μ= 59,000miles.