Strand 1 Chapter 5 Inferential Statistics

1. I know that drawing conclusions about a population based on a sample is a process called Inferential Statistics.
2. A **parameter** is a numerical property of a **population**.
3. A **statistic** is a numerical property of a **sample**.
4. I understand the concept of **'distribution of sample mean'** or the distribution **'the sampling distribution of the mean'**.
   Example 1 Page 179.
5. **I understand the key aspects of the Central Limit Theorem:**
6. **If a random sample of size n with mean x is taken from a population with mean u and standard deviation @, then**

   If the sample size is large (n>30), the distribution of the sample means will approximate to a normal distribution regardless of what the population distribution is.

   The mean of the distribution will be the same as the population mean u

   The standard deviation of the sampling distribution (@x) is given by @/√n (known as the standard error of the mean...as n increases the standard error gets smaller)

   If the underlying population is normal, the sampling distribution of the mean will always have a normal distribution even if the sample size is small (<30)

7. I know how to, when dealing with the sampling distribution of the mean, convert the given units to standard units using

$$Z = \frac{X - \mu}{\sigma_{\bar{X}}} \quad = \quad Z = \frac{\bar{X} - \mu}{\sigma / \sqrt{n}}$$

Example 2, 3, 4 and 5 Page 181

Ex 5.1 Q1 – Q17 Odd Page 184

8. If x is the mean of a random sample of size n taken from a population with normal distribution with known standard deviation @, **then the end-points of the 95% confidence interval for u,** the population mean, are given by

$$\overline{X} \pm 1.96\,\sigma/\sqrt{n}$$

Example 1, 2, 3 and 4 Page 188

Ex 5.2 Q1 – Q13 Odd Page 5.2

9. The standard error of the sampling distribution of the proportion (given that many samples of the same size were taken from a population with each sample producing a different but similar proportion) is given by

$$\sigma_{\widehat{p}} = \sqrt{\frac{p(1-p)}{n}}$$

10. The 95% confidence interval for a population proportion

$$p \pm 1.96 \times \sqrt{\frac{p(1-p)}{n}} \qquad (1)$$

See page 193 Text and Tests.

Example 1 and 2 Page 193

Ex 5.3 Q1 – Q9 Odd

11. I know that a Hypothesis test is a statistical method of proving the truth or otherwise of a statement known as **H_0 the Null Hypothesis**
12. I know that at the 5% level of significance, the null hypothesis is rejected if z , -1.96 or z > 1.96

13. I know how to perform a hypothesis test for the mean as per Page 197
Example 1 Page 197

14. I know how to evaluate the **p-value (probability value)** and know that the smaller the p-value is, the stronger is the evidence against H_0 provided by the data.

15. I know how to test the significance of using a p-value as per page 200.
    Examples 2 and 3 Page 200
    Ex 5.4 Q1 – Q13 Odd