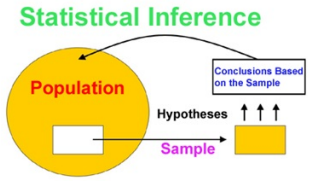
Week 12
Term 3
2019

HAWKER COLLEGE
Engage | Inspire | Achieve

Learning Brief
SM4

Goals

This week: Topic 3: Statistical inference



Source: https://goo.gl/KMmFbC

Sample means:

- examine the concept of the sample mean $\bar{X}$ as a random variable whose value varies between samples where X is a random variable with mean μ and the standard deviation σ
- simulate repeated random sampling, from a variety of distributions and a range of sample sizes, to illustrate properties of the distribution of $\bar{X}$ across samples of a fixed size n, including its mean μ, its standard deviation $\sigma/\sqrt{n}$ (where μ and σ are the mean and standard deviation of X), and its approximate normality if n is large
- simulate repeated random sampling, from a variety of distributions and a range of sample sizes, to illustrate the approximate standard normality of $\frac{\bar{X}-\mu}{s/\sqrt{n}}$ for large samples ($n \geq 30$), where s is the sample standard deviation.

Theoretical Components

Read the notes and study the examples.
(Classroom/ABOUT/Resources/S2/Term4/WK12)

Mathspace:

CLT Lesson 1: https://goo.gl/36DDiQ

Further notes/examples:

https://goo.gl/2isZJo

Video Examples:

- https://bit.ly/32rWQtQ
- https://bit.ly/2J00gfM

CAS CP400: Sampling Dist of Sample Mean

https://youtu.be/moj-2A6IGRc

Practical Components

Exercises: attempt questions from mathspace (log in first, then click on the following links to see the questions:

- https://goo.gl/hKzv2N
- https://goo.gl/ZancxD

Investigation

A population consists of the five numbers 2, 3, 6, 8, 11. Consider all possible samples of size two which can be drawn with replacement from this population. Find (a) the mean of the population, (b) the standard deviation of the population, (c) the mean of the sampling distribution of means, (d) the standard deviation of the sampling distribution of means, i.e. the standard error of means.

(1+1+3+1=6 marks)

QFO
Quiz/Forum/Other

Further reading: https://bit.ly/2pTd3tF