

SAMPLING DISTRIBUTION OF SAMPLE MEANS

Suppose we are sampling from a population with mean (μ) and standard deviation (σ), let $\bar{X}$ be a random variable representing **sample mean** of n independently drawn observations. This then means:

- a) The mean of the sampling distribution of sample means is equal to the mean of the population
i.e. $\mu_{\bar{X}} = \mu$
- b) The standard deviation of the sampling distribution is $\sigma / \sqrt{n}$

For probability calculations, we either standardize:

- 1) a single value (x) as $Z = (x - \mu) / \sigma$
- 2) the mean of n observations as $Z = (\bar{X} - \mu) / (\sigma / \sqrt{n})$

Examples

The number of bacteria found in the gut of a bull was approximately normally distributed with mean 740 and standard deviation 20.

- a) what is the probability a randomly selected bull has atleast 760 bacteria count?
- b) What is the probability the mean of 9 randomly selected animals will have a bacteria count of atleast 760?
(To be done in video)

