// Resampling

→ Confidence interval for population mean.

$$\bar{x} \pm z\, SE(\bar{x})$$

Monk Carlo method :- (Simulation)

→ What's the average height of all people in US?

let's take $n = 100$ & use this average as an estimate.

let θ = avg height of parameter. $= \frac{1}{n} \sum_{i=1}^{n} x_i$

→ We approximate a fixed quantity θ by average of independent random variables that have expected value θ.

→ By law of large numbers, the approximation error can be made arbitrarily small by using a large enough sample size.

$$SE(\hat{\theta}) = \sqrt{E(\hat{\theta} - E(\hat{\theta}))^2}$$

Bootstrap principle :-

$\hat{\theta}$ → estimate.

plug-in principle } Pretends sample histogram is population histogram and then uses Monte Carlo

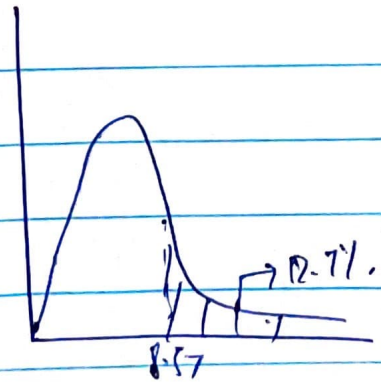
→ only possible in situation where we cannot draw as many samples as we wish.

Chi Square test :-

$$X^2 = \sum_{\text{all categories}} \frac{(\text{observed} - \text{expected})^2}{\text{expected}}.$$

if X^2 is large, evidence against H_0.

DOF = categories − 1



For homogeneity,

DOF = (Columns − 1) × (rows − 1)