1. * Population : Total Observation

* Sample : a portion of the population

Sample

$n = 100$

Population

$N = 10000$

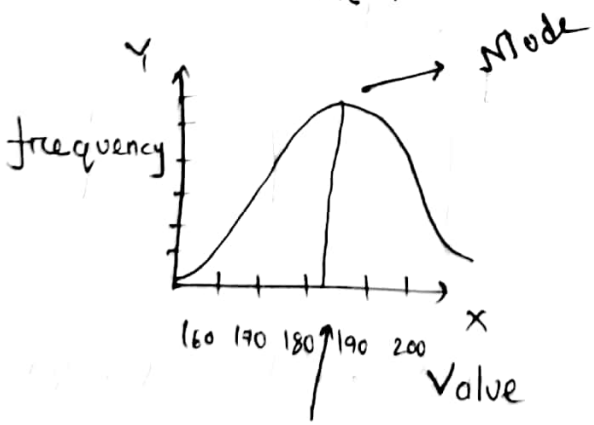
* Central Tendency →

Mean, Median, Mode

Mean $\bar{x} = \frac{\sum_{i=1}^{n} x_i}{n}$ $\mu = \frac{\sum_{i=1}^{N} x_i}{N}$

Standard Deviation $SD = \sqrt{\text{Variance}} = \sqrt{\frac{\sum_{i=1}^{n} (x_i - \bar{x})^2}{n-1}}$

Normal Distribution :



$\bar{x}$ = mean

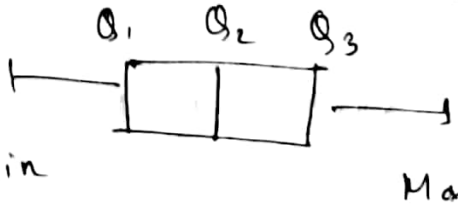
M = Median

160, 165, 170, 175

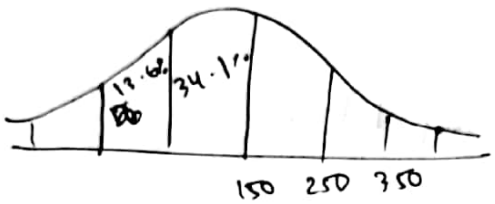
↓

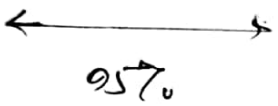
Avg is median

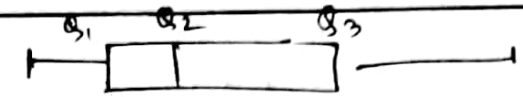
Whisker Plot / Box plot :



Bell shaped Curve







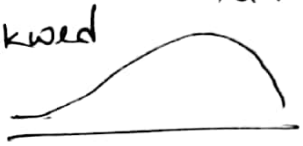
$Q_3 - Q_2 > Q_2 - Q_1$

Right ~~tailed~~ skewed

$\bar{x}$ > Median > Mode

tail

Left skewed



$\bar{x}$ < Median < Mode

Skewness

→ Positive / Right tail

→ Negative / Left tail

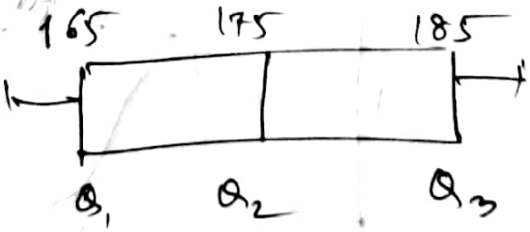
$Q_2 - Q_1 > Q_3 - Q_2$

160, 165, 170, 175, 180, 185, 190

Q_2 = Median Value = 175

Q_1 = ~~Min~~ Left Part's Median = 165

Q_3 = ~~Max~~ Right Part's Median = 185



Range = 190 − 160 = 30

Inter Quantile Range = $Q_3 - Q_2$ = 185 − 175 = 10

Give $\bar{x}$ = 170

SD = 5

within 1 SD = 68.27%

Hypothesis Testing:

Given, residents ^{avg} weight 168 lb, taking sample 36 individuals, average weight of sample 169.5 lbs. Std deviation of sample 3.9

Can we say 95% confidence level to discard the null hypothesis?

	Mean	Std
mean of population	μ	σ
" " sample	$\bar{x}$	s

$H_0: \mu = 168$

$H_a: \mu \neq 168$

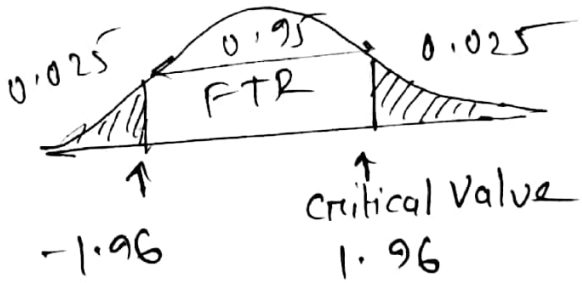
$n = 36$

$\bar{x} = 169.5$

$s = 3.9$

$c = 0.95$

$\alpha = 0.05$



FTR = fail to Reject

Z-cal > Zcv

2.31 > 1.96

$\therefore$ we can reject the null hypothesis.

Z-value calculated $= \dfrac{\bar{x} - \mu_0}{s/\sqrt{n}}$

$= \dfrac{169.5 - 168}{3.9/\sqrt{36}}$

$= 2.31$

p-value $< \alpha$