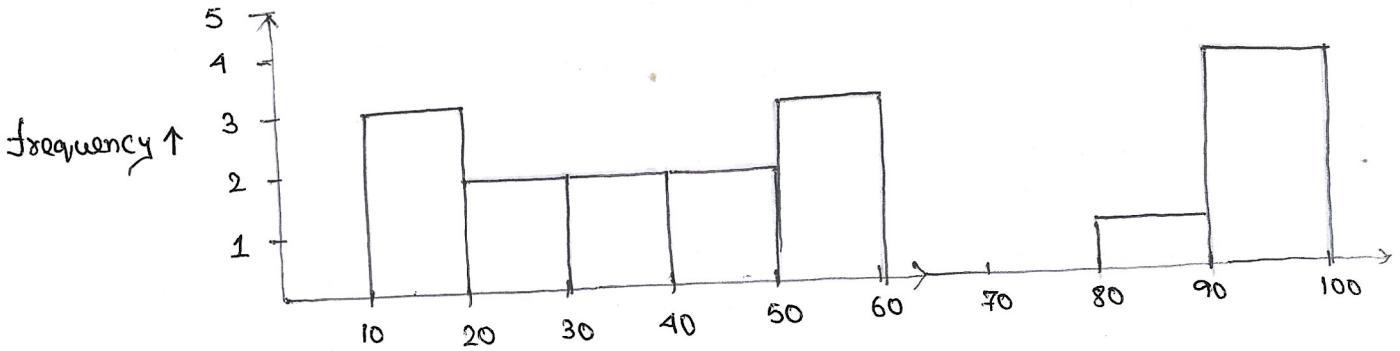
Assignment

Q1) Plot a histogram

10, 13, 18, 22, 27, 32, 38, 40, 45, 51, 56, 57, 88, 90, 92, 94, 99

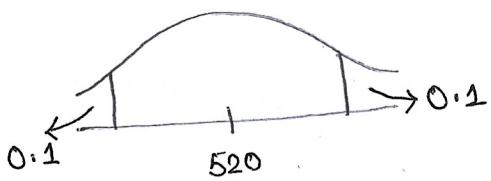


assuming bins = 10, bin size = $\frac{100}{10} = 10$

Q2) In a quant test of the CAT Exam, the population standard deviation is known to be 100. A sample of 25 tests taken has a mean of 520. Construct an 80% CI about the mean

$\sigma = 100$, $n = 25$, $\bar{x} = 520$, CI = 80%

significance level = (100 − 80)%
= 20%
= 0.2



$$\bar{x} \pm Z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

$$= 520 \pm Z_{0.1} \frac{100}{\sqrt{25}}$$

$$= 520 \pm 1.29 \times \frac{100}{5}$$

$$= 520 \pm 25.8$$

Range → 520 − 25.8 to 520 + 25.8
= 494.2 to 545.8

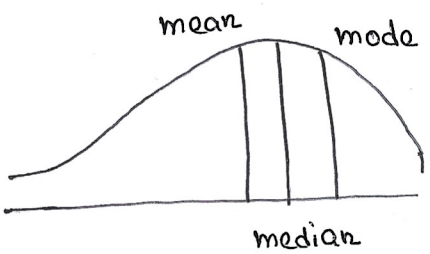
Q4) What is the value of 99 percentile?

2, 2, 3, 4, 5, 5, 5, 6, 7, 8, 8, 8, 8, 8, 9, 9, 10, 11, 11, 12

index = $\frac{99}{100} \times (n+1) = \frac{99}{100} \times 21 = 20.79$

as there is no points available after 20th index so 99%-ile value is 20th index value i.e. 12

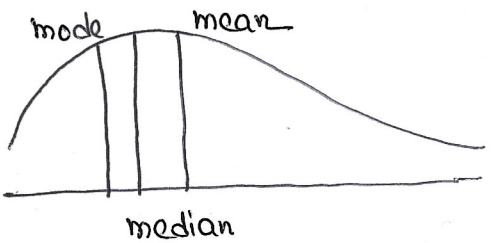
Q5) In left skewed & right skewed, what is the relationship between mean, median, & mode? Draw a graph to represent the same



Left skewed

In case of left skewed data

mean < median < mode



In case of right skewed data

mean > median > mode

Q3) A car owner, believes that % of citizens in city ABC that owns a vehicle is 60% or less. A sales manager disagrees with this. He conducted a hypothesis testing surveying 250 residents & found that 170 residents responded yes to owning a vehicle.

a) state null & Alternate hypothesis.
b) At a 10% significance level is there enough evidence to support the idea that vehicle owner in ABC city is 60% or less.

Ans→

$H_0 : P_0 \leq 60\%$

$H_1 : P_0 > 60\%$

$q_0 = 1 - P_0 = 1 - 0.6 = 0.4$

Given $n = 250$, $x = 170$,

$\therefore \hat{p} = \frac{x}{n} = \frac{170}{250} = 0.68$

Given significance level = 10% = 0.1

- decision boundary :

- test statistic = $\frac{\hat{p} - P_0}{\sqrt{\frac{P_0 q_0}{n}}} = \frac{0.68 - 0.60}{\sqrt{\frac{0.6 \times 0.4}{250}}} = \frac{0.08}{0.03} = 2.66$

As $2.66 > 1.29$ we reject the null hypothesis so the car owner's belive that in ABC city who owns a vehicle is $\leq 60\%$ is not true.