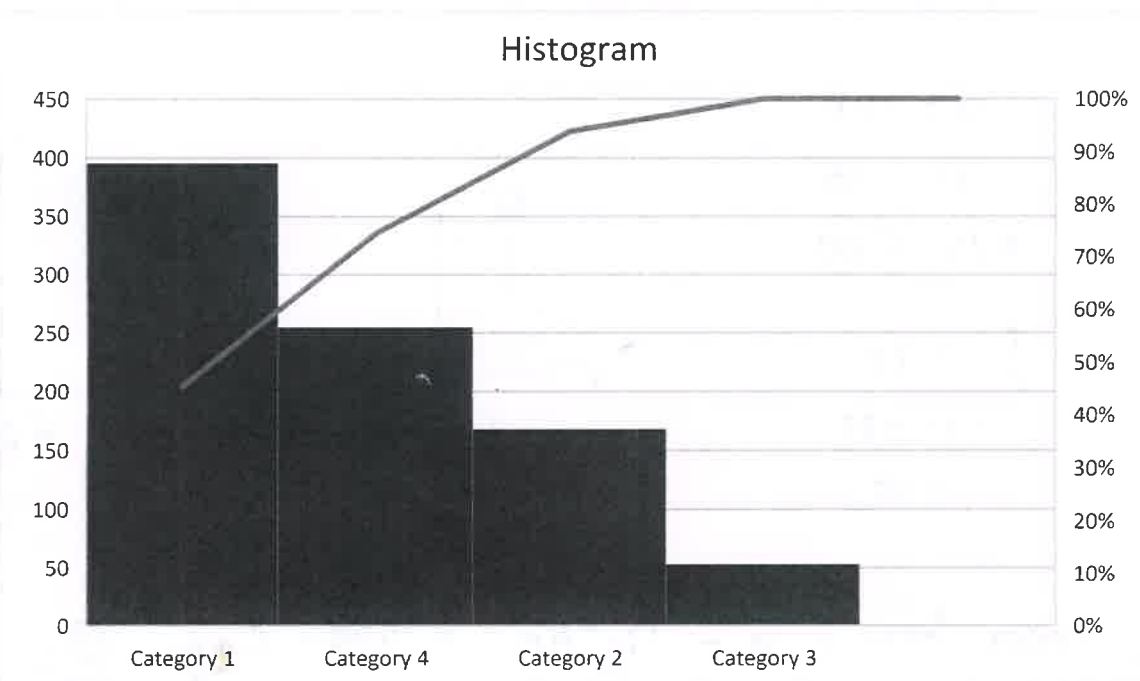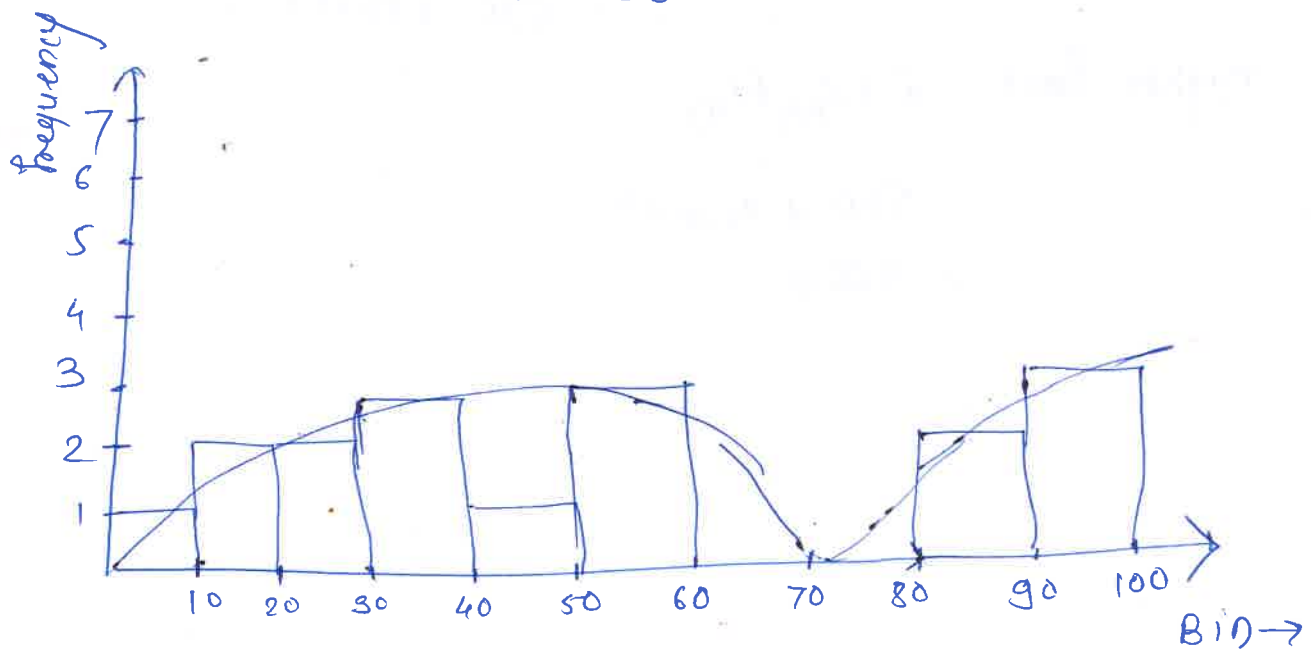1. Plot a histogram,
   10,13,18,22,27,32,38,40,45,51,56,57,88,90,92,94,99
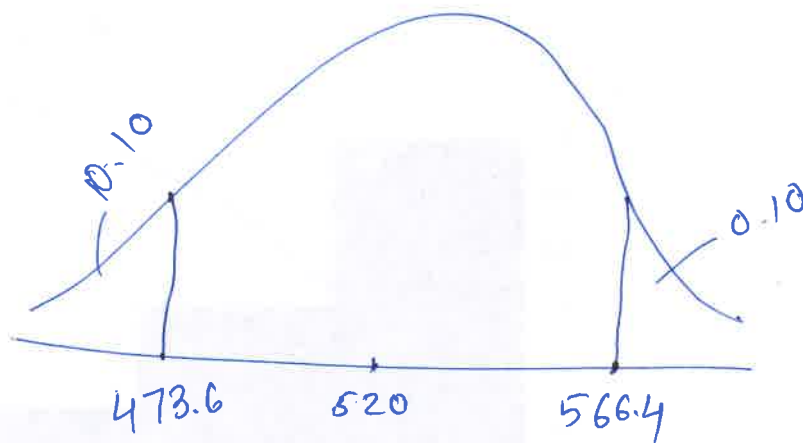
Histogram

Let consider. Bin Size = 10
               Bin = 010

2. 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.

$\sigma = 100$

$n = 25$

$\bar{x}/s = 520$

$\alpha = 1 - CI$

$\quad = 1 - 0.80$

$\quad = 0.20$

473.6   520   566.4

Lower fence $= \bar{x} - Z_{\alpha/2}\,\sigma/\sqrt{n} \quad = 520 - Z_{\frac{0.20}{2}}\,\dfrac{100}{\sqrt{25}}$

$\quad = 520 - Z_{0.10}\,20$

$\quad = 520 - 2.32 \times 20 \; =$

Higher fence $= \bar{x} + Z_{\alpha/2}\,\sigma/\sqrt{n}$

$\quad = 520 + Z_{0.10}\,20$

$\quad = 566.4$

3. A car believes that the percentage of citizens in city that owns a vehicle is 60% or less. A sales manger disagrees with this. He conducted a hypothesis testing surveying 250 residents and found that 170 residents responded yes to owning a vehicle.
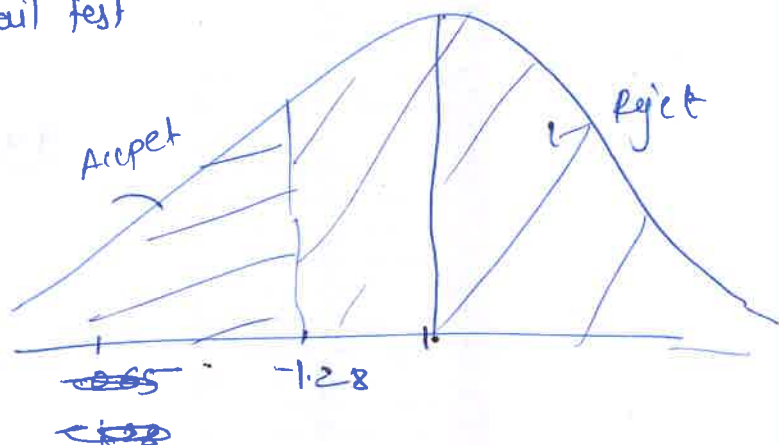   i.   State the null & alternate hypothesis
    ii.   At a 10% significance level, is there enough evidence to support the idea that vehicle owner in ABC city is 60% or less.

$\longrightarrow$ $H_0 \leq 60\%$

$H_1 > 60\%$ $\rightarrow$ 1 tail test

$n = 250$

$x = 176$

$\hat{P} = \dfrac{x}{n} = \dfrac{170}{250} = 0.68$

$q_0 = 1 - P_0$
$\quad = 1 - 0.60$
$\quad = 0.40$

Accept   Reject

-1.28

$Z_{test} = \dfrac{\hat{P} - P_0}{\sqrt{\dfrac{P_0 q_0}{n}}} = \dfrac{0.68 - 0.60}{\sqrt{\dfrac{0.60 \times 0.40}{250}}} = \dfrac{0.08}{0.03098}$

$= 0.258$

$\lambda = 0.10$

$0.258 > -1.28$

$\quad\quad\quad -$ Reject the Ho

with P value $= 1 - 0.10027$
$\quad\quad\quad = 0.8997$

$0.8997 \overset{?}{>} 0.10 \quad - \left(\text{Reject or Accept} \right) \text{?}$

4. What is the value of the 99 percentiles?

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

B2	▾	⋮	× ✓	f_x	=PERCENTILE.INC(A2:A21,0.99)	

◢	A	B	C	D
	Data set	99th percentile		
1				
2	2	11.81		
3	2			
4	3			
5	4			
6	5			
7	5			
8	5			
9	6			
10	7			
11	8			
12	8			
13	8			
14	8			
15	8			
16	9			
17	9			
18	10			
19	11			
20	11			
21	12			

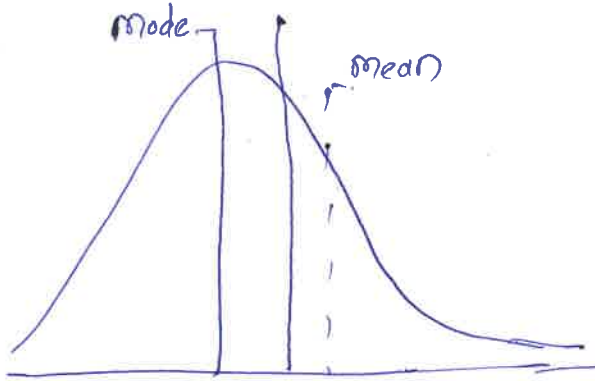$$99\% = \frac{x}{20}$$

$$x = 0.99 \times 20$$

$$= 19.8 \text{ index}$$

$$19.8\,index = \frac{11+12}{2} = \frac{23}{2} = 11.5$$

5. In left & right skewed data, what is the relationship between mean, median and mode? Draw the graph to represent the same.
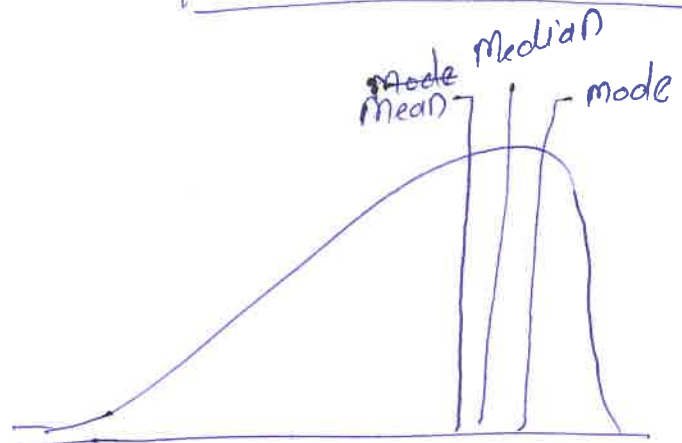
Ans:

Mean > Median > Mode

Mode

Median

mean

Positive Skew
(Right skew)
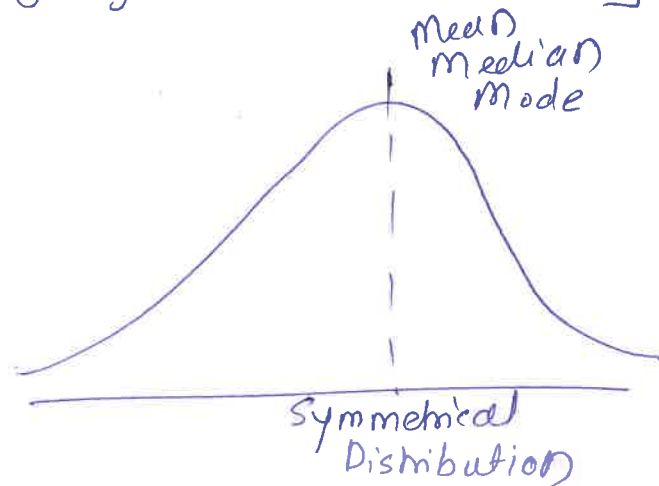
e.g. Wealth Distribution
lengths of comments

Mode > Median > Mean

Mode
Mean

Median

mode

Negative Skew
(Left skew)

e.g. ~~Age~~ life span of human being

Mean
Median
Mode

Symmetrical Distribution

e.g. Age Distribution

Mode = Median = Mean