Statistics

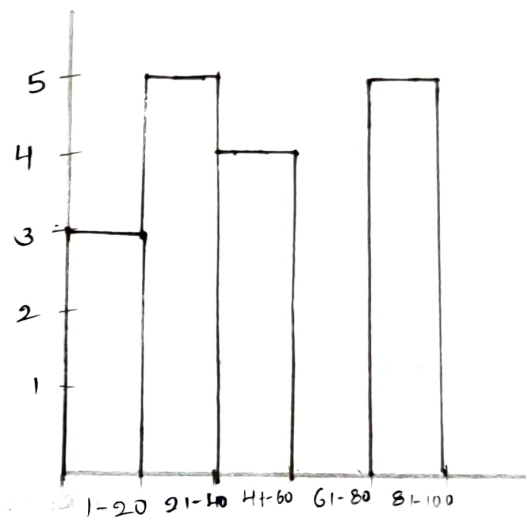**Que 1)** Plot a histogram

10, 13, 18, 22, 27, 32, 38, 40, 45, 51, 56, 57, 88, 90, 92, 94, 98

A: classes :. 5

classes width   100/5 = 20
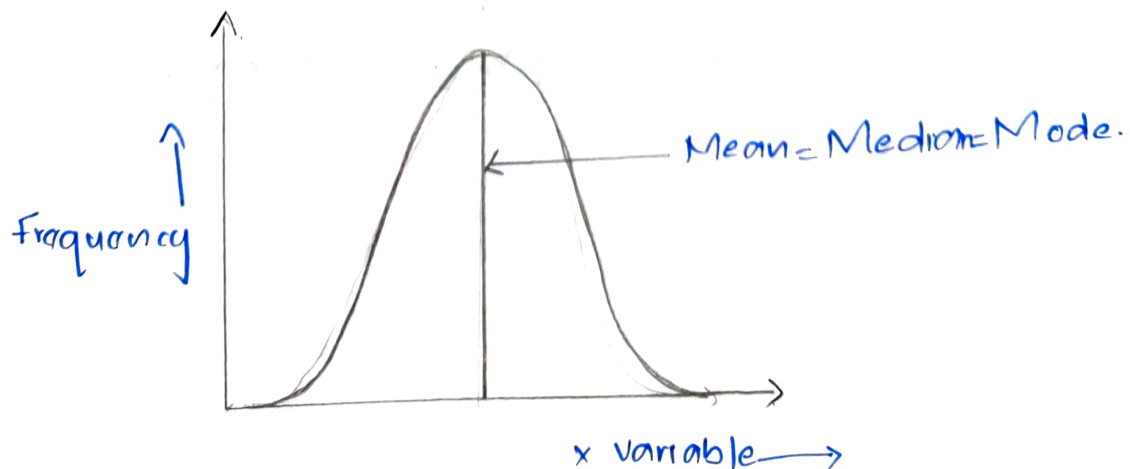
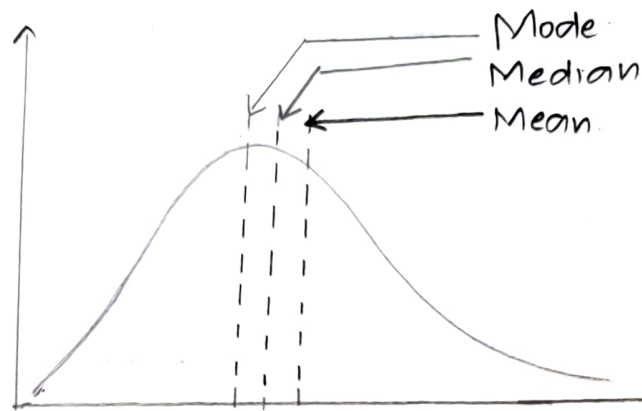| Numbers	frequency
1 - 20	3
21 - 40	5
41 - 60	4
61 - 80	
81 - 100	5

Ques 5)   In left & right - skewed data. what is the relationship between mean, median, mode?

Draw the graph to represent same.

A: If a frequency distribution graph has symmetrical frequency curve, then mean, median and mode will be Equal.
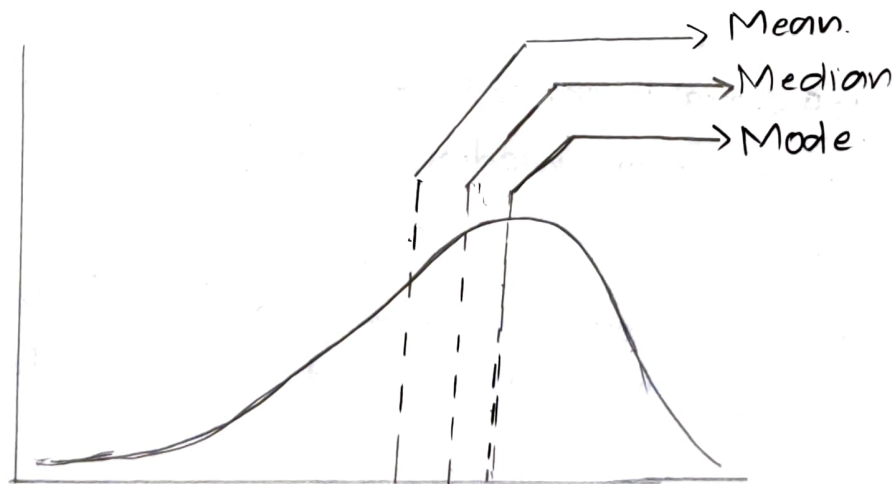

Mean = Median = Mode.

In case of a positively (Right skewed) Frequency distribution the mean is always greater than median and the median is always greater than mode.

Mode
Median
Mean

Mean > Median > Mode.

In case of negatively skewed (Left skewed) Frequency distribution the mean is always lesser than median, and median is always lesser than mode.

Mean.
Median
Mode

Mean < Median < Mode.

Que 4)   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

A:-

Value $= \dfrac{\text{Percentile}}{100} (n+1)$ $n = 20$

Value $= \dfrac{99}{100} (20+1)$

$= 20.79.$

the value of 99 percentile is 12

Que 2)   In a quant test of the CAT Exam, the population standard deviation is known to be 100. A sample of 25 tests has mean of 520. construct an 80·l· ● CI about the mean.

A:-

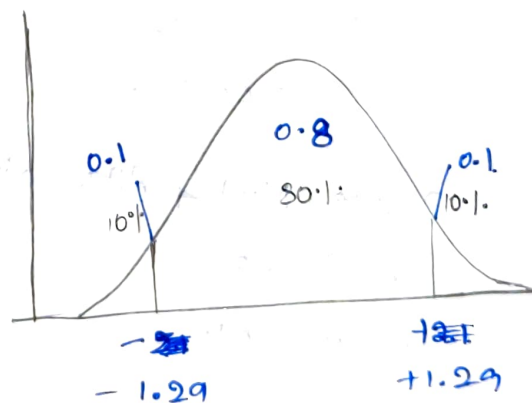C.I $= \bar{x} \pm Z_{\alpha/2} \dfrac{\sigma}{\sqrt{n}}$

Given,

n = 25

$\bar{x} = 520$

S.D $(\sigma) = 100$

$\alpha = 0.2.$

0·1
16°/·
0·8
80·l·
0·1
10·l·
−1.29
+1.29

$Z_{0.2/2} = Z_{0.1.}$

Area of tail is $= 0.1$

Area of body is $= 1-0.1 = 0.9$

$$CI = \bar{x} \pm z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

$$= 520 + (1.29) \frac{100}{\sqrt{25}} = 545.8$$

$$= 520 - (1.29) \frac{100}{\sqrt{25}} = 494.2$$

I am 80% confident the mean CET score is between

494.2 and 545.8

Que 3) A company believes that the percentage 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 owing a vehicle.

    a) state the null & alternate hypothesis.

    b) At a 10% significant level, is there enough evidence to support the idea that vehicle owner in ABC city 60% or less.

A:-   i) Define Null & Alternative hypothesis.

    $H_0, P \leq 60\%$
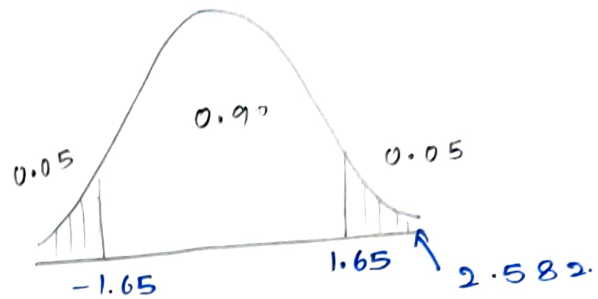
    $H_1; P > 60\%$

  2)   State Alpha $CI = 1 - \alpha$

       $\alpha = 0.10$ $= 1 - 0.1$

                            $CI = 0.90$

  3)   state Decision rule.

Above the curve: 0.05 (left shaded), 0.95 (center), 0.05 (right shaded), -1.65, 1.65, 2.582

-1.28

If Z is less than -1.28 then we will reject null hypothesis.

4) $n = 250$ $x = 170$

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

$$P_0 = 0.6$$

$$q_0 = 1 - P_0 = 0.4$$

$$Z = \frac{\hat{p} - P_0}{\sqrt{\dfrac{P_0 \, q_0}{n}}} = \frac{0.68 - 0.6}{\sqrt{\dfrac{0.6 \times 0.4}{250}}} = \frac{0.08}{\sqrt{0.00096}} = \frac{0.08}{0.03098}$$

$$Z = 2.582$$

∴ At 10% significant level, there is enough evidence to reject the idea that vehichle ownership in city 60% or less.