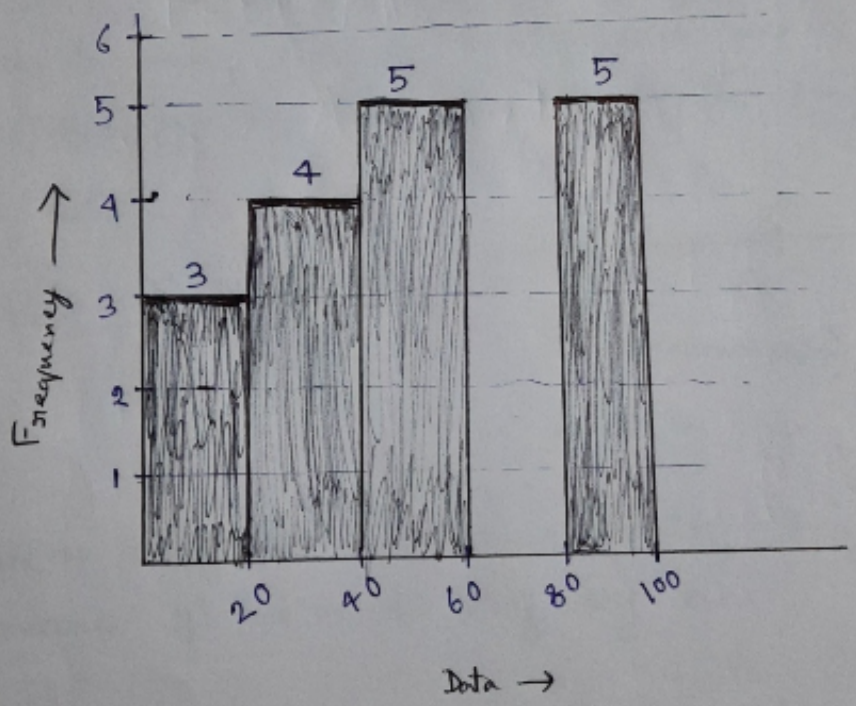
Statistics Assignment by Madhupa Samanta _FSDA

ASSIGNMENT – (1)

Q. Dataset = {10, 13, 18, 22, 27, 32, 38, 40, 45, 51, 56, 57, 88, 90, 92, 94, 99}

Create Histogram if ~~there~~ are 5 bins of ~~length~~ (width) = 20.
Interval = [0 – 100].

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



Regards,
Madhupa Samanta
(FSDA batch - June22)

Assignment (2)

Que (2)

In the Quant test of CAT exam the population standard deviation is known to be 100. A sample of 25 test takers has a mean of 520. Construct a 80% CI about the mean.

$$ME = Z_{\alpha/2} * \frac{\sigma}{\sqrt{n}}$$

$$= 1.3 * \frac{100}{\sqrt{25}}$$

$$= 26$$

$1-\alpha = 80\% = 0.80$

$\alpha = 0.20$

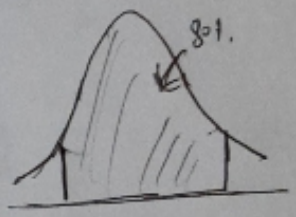
$Z_{\alpha/2} = Z_{0.10}$

$= 1.3$

Area

$1 - 0.10$

$= 0.90$



$$CI = \left[\bar{x} - ME, \bar{x} + ME\right]$$

$$= \left[520 - 26, 520 + 26\right]$$

$$= \left[496, 546\right]$$

Ans.

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Que ③ A car believes that the percentage of citizens in the city ABC that owns a vehicle is 60% or less. A sales manager disagree with this. He conducted a hypothesis testing surveying 250 residents & found that 170 residents responded Yes to owning a vehicle.

(a) State the 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 (a) $H_0 : P_0 \leq 0.60$ P_0 = Percentage of citizens in city ABC that owns a vehicle

$H_1 : P_0 > 0.60$

So the test is one tailed test.

(b) $\alpha = 10\%$.

Sample size $(n) = 250$

Sample Percentage of owning vehicle $= \frac{170}{250} = 68\%$.
$(\hat{p})$

$\therefore q = 1 - p = 0.32$

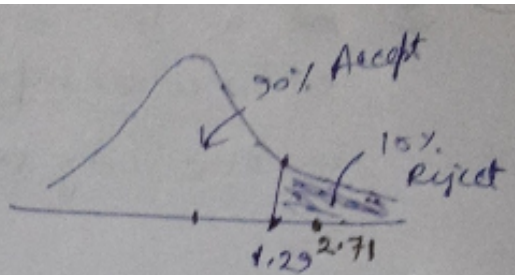
$\therefore$ Sample standard deviation $= \sqrt{pq} = \sqrt{0.68 \times 0.32}$

Z score of the sample stat $= \frac{0.68 - 0.60}{\sqrt{\frac{0.68 \times 0.32}{250}}}$

$= 2.711$

Here $\alpha = 10\%$

$Z_\alpha = 1.29$



Sample Z-score = $2.71 > 1.29$

So we REJECT the null hypothesis

At a 10% significance level,

i.e, We reject the idea that the percentage of vehicle owner is less or, equals to 60%.

Que ④ What is the value of the 99 percentile?

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

$n = 20$

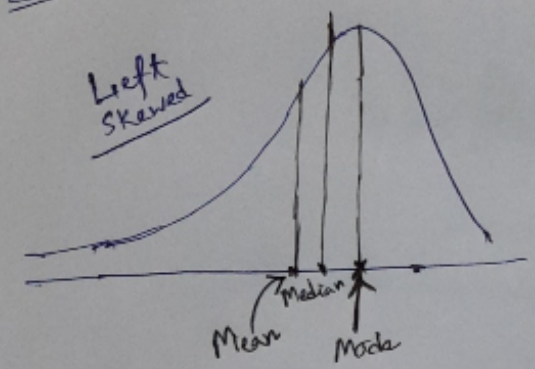
Index of 99 percentile $= \frac{99}{100} \times (20+1)$

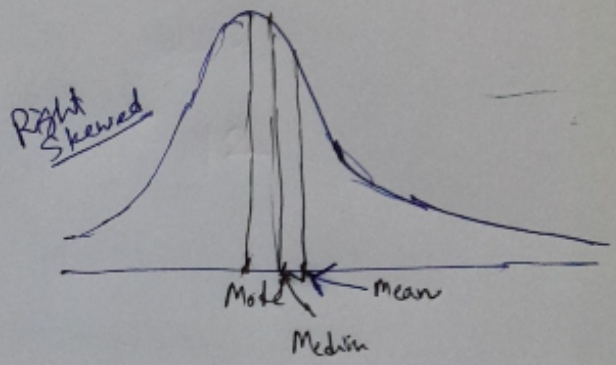
≈ 20

Value of 99 percentile $= 12$

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

For





Mode > Median > Mean

i.e, Mode exceeds Median and Mean.

for Left Skewed distribution

Mean > Median > Mode

i.e, Mean exceeds Median and Mode in Right skewed distribution.