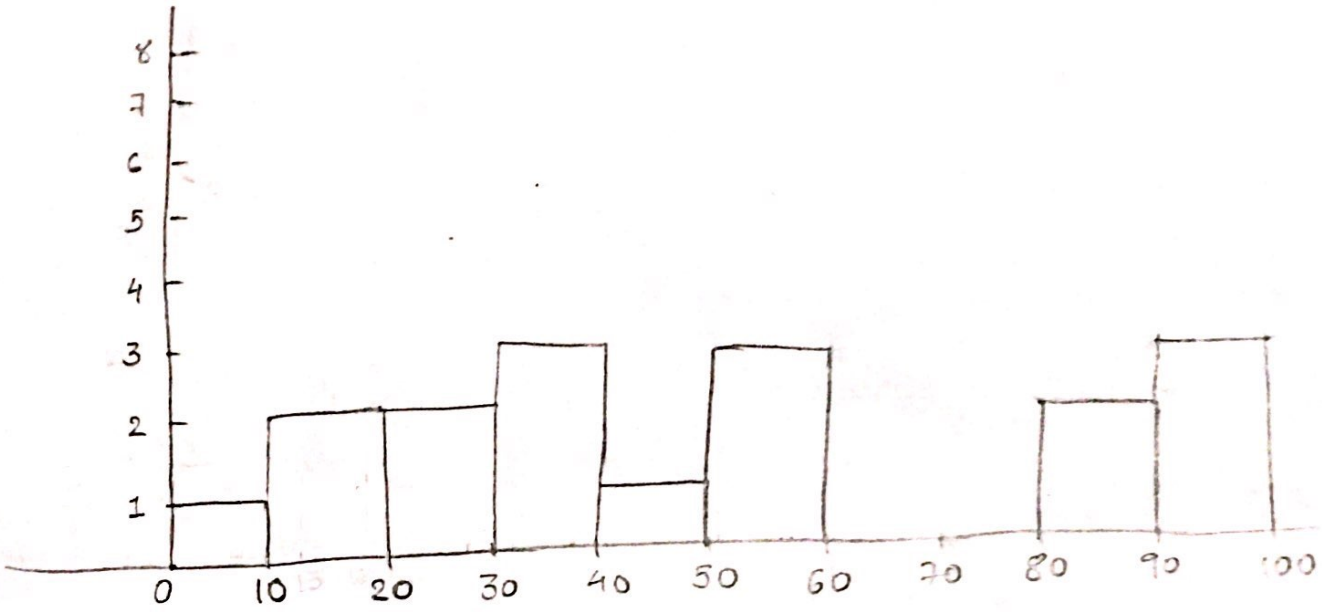
Q. 1 Plot a Histogram

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



bin = 10.

Q. 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.

Answer

Given data: $\sigma_p = 10$

$n = 25$

$\bar{x} = 520$

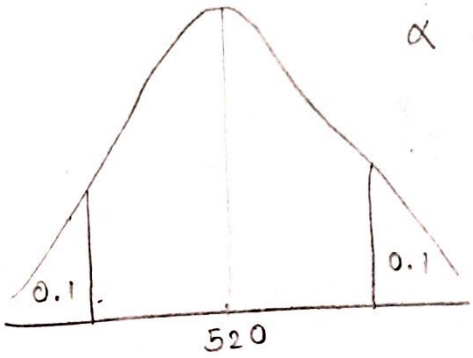
C.I. = 80%

$\alpha = 0.20$

$\frac{\alpha}{2} = 0.1$

$Z_{0.1}$ = Zscore (0.9)

$= \pm 1.29$



Confidence Interval = Point Estimate $\pm$ Margin of Error.

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

Lower pence $= \bar{x} - Z_{0.1} \frac{\sigma}{\sqrt{n}}$

$= 520 - 1.29 \times \frac{10}{\sqrt{25}}$

$= 520 - 1.29 \times 2$

$= 520 - 2.58$

$= 517.42$

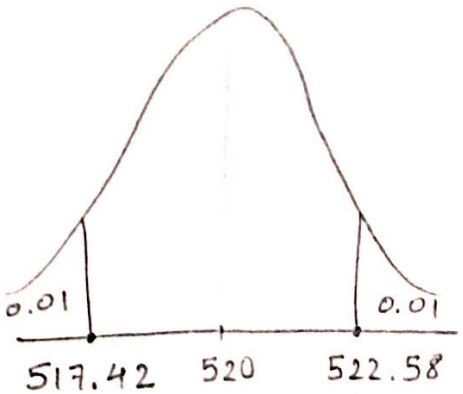
Higher pence $= \bar{x} + Z_{0.1} \frac{\sigma}{\sqrt{n}}$

$= 520 + 1.29 \times \frac{10}{\sqrt{25}}$

$= 520 + 1.29 \times 2$

$= 520 + 2.58$

$= 522.58$



∴ The value of confidence Interval is 517.42 to 522.58

Q.3 A Con 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 owning a vehicle.

(a) state the null & alternate hypothesis.

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

Answer

step 1 Null Hypothesis $H_0 = P_0 = 60\%$

Alternate Hypothesis $H_1 = P_0 \neq 60\%$

$n = 250$

$x = 170$

$\alpha = 0.10$

$CI = 90\%$

step 2 $\hat{p} = \frac{x}{n} = \frac{170}{250} = 0.68$

$P_0 = 0.6$

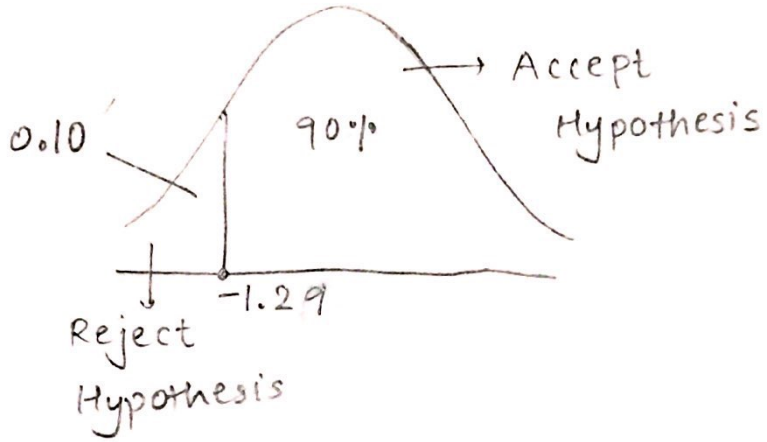
$q_0 = 1 - P_0$

$= 1 - 0.6$

$q_0 = 0.4$

step 3

$\alpha = 0.10$



step 4

$$Z\ test = \frac{\hat{p} - P_0}{\sqrt{\frac{p_0 q_0}{n}}}$$

$$= \frac{0.68 - 0.6}{\sqrt{\frac{0.6 \times 0.4}{250}}}$$

$$= \frac{0.08}{0.0309}$$

$Z_{test} = 2.588$

$2.58 > -1.29$. then it Accept the Null Hypothesis.

∴ It accept the Null Hypothesis then there is an enough evidence to support.

Q.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

→ $$\text{Value} = \frac{\text{Percentile}}{100} \times (n+1)$$

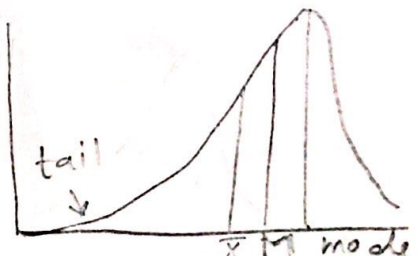
$$= \frac{99}{100} (11+1)$$

$$= 11.88 \rightarrow \text{Index.}$$

$$\text{Average value} = \frac{8+8}{2} = 8$$

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

→ left skewed



- mean is less than the median, which is often less than the mode.

$$\bar{x} < M < \text{mode}$$

Right skewed

$\bar{x}$ = mean
M = median

- mode is often less than the median, which is less than the mean.

- $\bar{x} > M >$ mode