

12/7/22

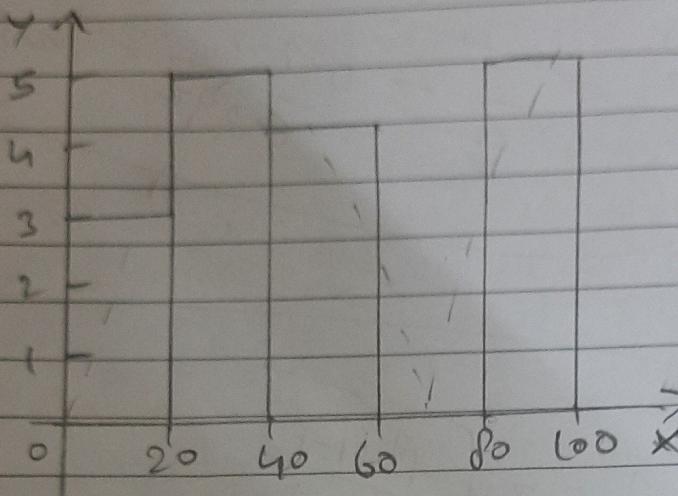
Date _____

Statistics - Assignment 1

1) plot a histogram

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

Sol: Bin = 5 ; Bin Size = $100/5 = 20$



- 2) In a quart 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 a 80% CI about the mean.

Sol: $\sigma = 100$; $n = 25$; $\bar{x} = 520$; $C.I. = 80\%$.

$$\alpha = 1 - C.I. = 1 - 0.80 = 0.20$$

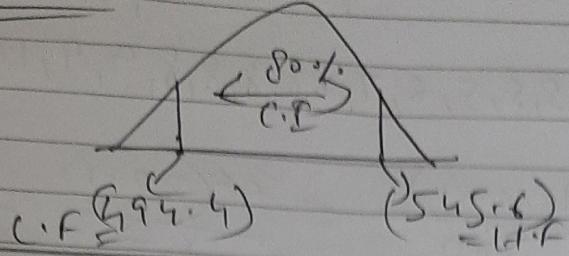
2 tail test

$$z_{\alpha/2} = z_{0.20} = z_{0.10}$$

$$\text{test} = \bar{x} \pm z_{\alpha/2} \left(\frac{\sigma}{\sqrt{n}} \right) = 520 \pm 1.28 \left(\frac{100}{\sqrt{25}} \right) = 520 \pm 25.6 = 545.6$$

$$L.F = \bar{x} - 1.28 \left(\frac{100}{\sqrt{25}} \right) = 520 - 25.6 = 494.4$$

$$H.F = \bar{x} + 1.28 \left(\frac{100}{\sqrt{25}} \right) = 520 + 25.6 = 545.6$$

80% C.I.

- 3) A car 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.

Sol: a) State null & hypothesis :
 \hat{P} = Alternative

$$\begin{cases} \mu_0 \leq 0.6 & \rightarrow \text{null hypothesis} \\ \mu_1 > 0.6 & \rightarrow \text{Alternative hypothesis.} \end{cases}$$

(Given) $p_0 = 0.6$, $n = 250$, $x = 170$; $\alpha = 0.05$

b) $(1 \text{ tail}) \alpha = 0.05 \rightarrow z_{\text{table value}} = 1.28$

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

$$q_0 = 1 - p_0 \Rightarrow 1 - 0.60 = 0.40$$

$$\begin{aligned} z_{\text{test}} &= \left(\frac{\hat{p} - p_0}{\sqrt{\frac{p_0(1-p_0)}{n}}} \right) = \left(\frac{0.68 - 0.60}{\sqrt{\frac{0.6(0.4)}{250}}} \right) \\ &= \frac{0.08}{\sqrt{\frac{0.24}{250}}} = \frac{0.08}{0.03} = 2.66 \end{aligned}$$

Since $(2.66 > 1.28)$; Null hypothesis is Rejected.

Conclusion :-

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Q) what is the value of the 99 percentile?

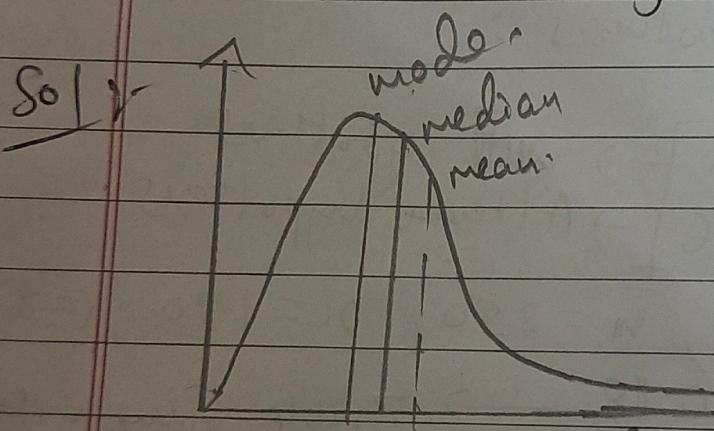
2, 2, 3, 4, 5, 5, 5, 6, 7, 8, 8, 8, 8, 8, 9, 9, 10, 11, 11, 12.

$$\text{Sol: } 99\% = \frac{99(4+1)}{100} = \frac{99(20+i)}{100} = \frac{99 \times 21}{100}$$

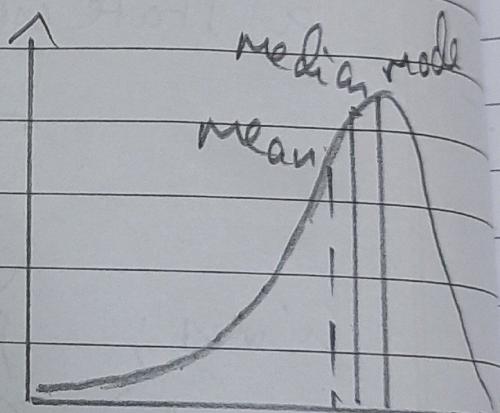
$$\text{Index} = 20.79 \Rightarrow \underline{\underline{12}}$$

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

Draw the graph to represent the same.



(Right skewed)



(Left skewed)

[mean > median > mode]

[mode > median > mean]