

Statistics Assignment

Ques 1) 10, 13, 18, 22, 27, 32, 38, 40, 45, 51, 56, 57, 88, 90, 92, 94, 99.

$$n = 1 + 3.322 \log_{10} N.$$

$$= 1 + 3.322 \log_{10} 17.$$

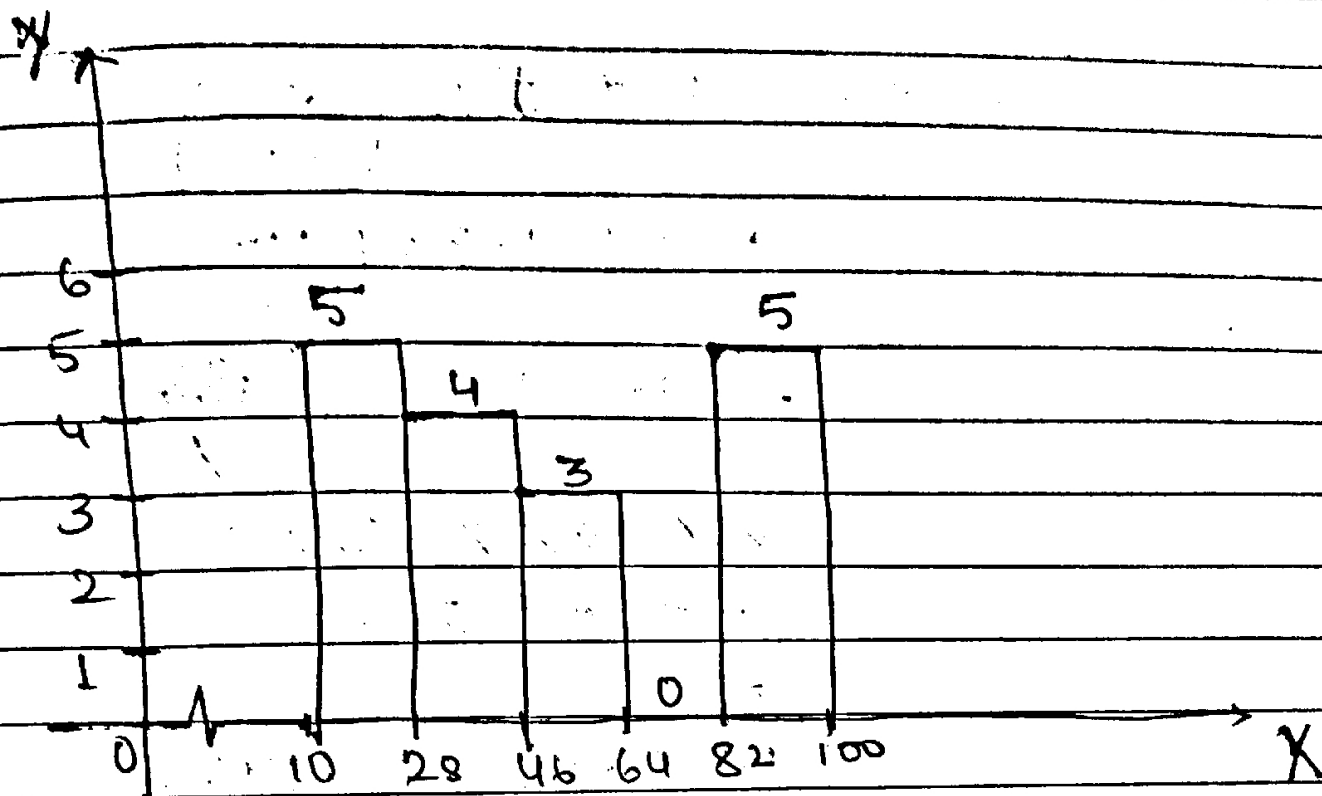
$$= 5.0876$$

$$n \approx 5.$$

$$W = \frac{H-L}{n} = \frac{99-10}{5} = 17.8 \approx 18$$

$$W = 18.$$

C.T	f.
10-28	5
28-46	4
46-64	3
64-82	0
82-100	5



Soln 2) Given

$$n = 25 \quad (n < 30)$$

$$\bar{x} = 4520$$

$$\sigma = 100.$$

$$df = 24.$$

At 20%.

$$\alpha = 0.2$$

$$\alpha/2 = 0.1$$

Table: EV.202

$$t_{\alpha/2} = 1.318$$

$$\begin{aligned}
 C.I &= \bar{x} \pm z/2 \left(\frac{\sigma}{\sqrt{n}} \right) \\
 &= 520 \pm 1.318 \left(\frac{100}{\sqrt{25}} \right) \\
 &= 520 \pm 1.318 \left(\frac{100}{5} \right)
 \end{aligned}$$

$$= 520 \pm 26.36$$

$$= 520 \pm 26.36$$

$$(493.64 ; 546.36) \text{ At } 80\% \text{ confidence.}$$

Sol 3)

Given

$$n = 250$$

$$x = 170$$

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

$$\hat{q} = 0.32$$

- a) Null Hypothesis $H_0: P \leq 0.6$.
 Alternate Hypothesis $H_1: P \geq 0.6$.

- b) At 10% significance level.

$$\alpha = 0.1$$

It is one-tailed test.

~~For~~ Z_{cal} :

$$Z_{cal} = \frac{\hat{p} - P}{\sqrt{\frac{PQ}{n}}}$$

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

$$= \frac{0.08}{\sqrt{0.00096}}$$

$$= \frac{0.08}{0.031}$$

$$Z_{cal} = 2.5806$$

i) Critical value comparison

$$\alpha = 0.01$$

~~2.58~~

$$\alpha = 0.1$$

$$Z_{\alpha} = -1.28$$

$$Z_{cal} > Z_{\alpha}$$

$$2.5806 > -1.28$$

\therefore We reject the Null Hypothesis at 10% LOS.

ii) P-value

$$\alpha = 0.01$$

$$p\text{-value} = 2 \times P(Z < Z_{cal})$$

$$= 2 \times P(Z < -1.28) = 2 \times 0.00494$$

$$p\text{-value} = 0.0099$$

$$p\text{-value} < \alpha$$

\therefore We reject the Null Hypothesis at 10% LOS.

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

To find

99 percentile

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

$$= \frac{99}{100} \times 20$$

$$= 19.8^{\text{th}} \text{ observation}$$

$$= 19^{\text{th}} \text{ obs} + 0.8$$

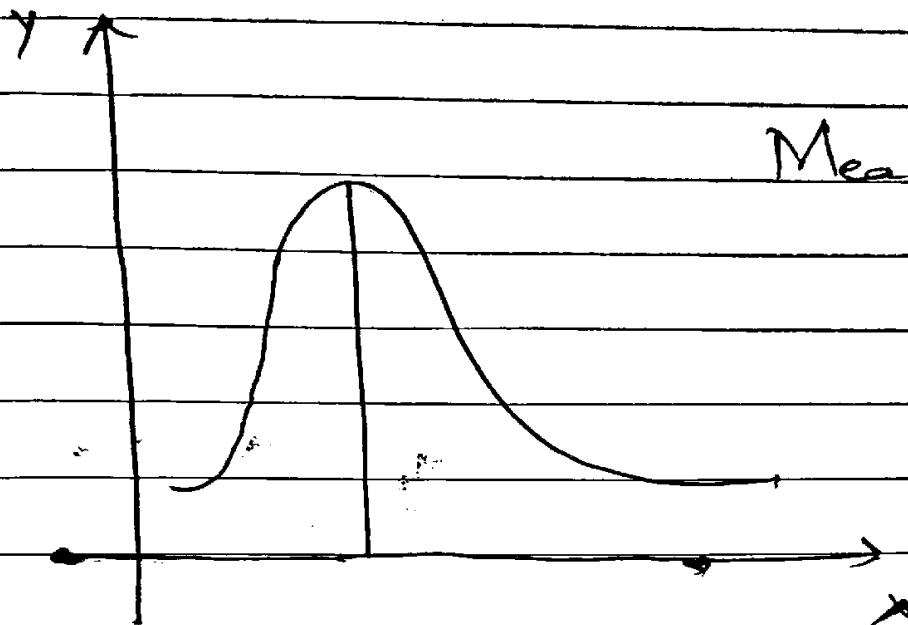
$$= 19.8^{\text{th}} \text{ observation}$$

$$= 19^{\text{th}} \text{ obs} + 0.8 (20^{\text{th}} - 19^{\text{th}})$$

$$= 11 + 0.8 (12 - 11)$$

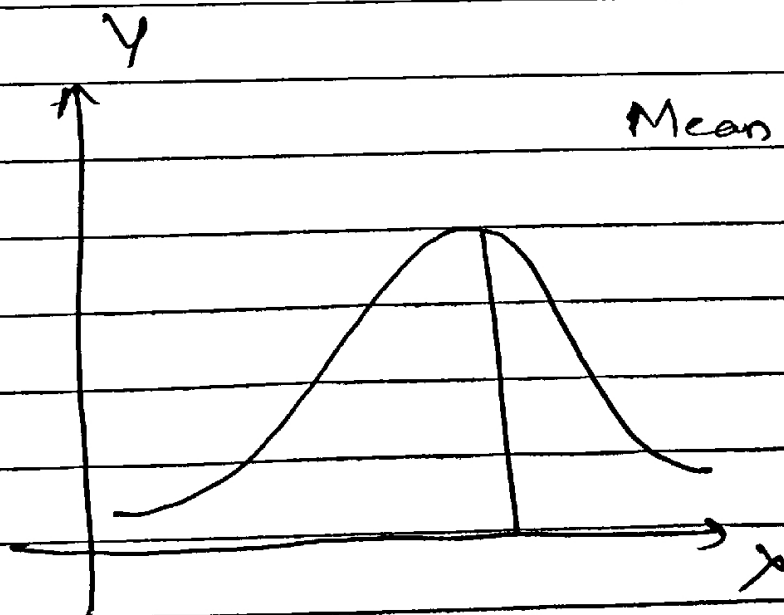
$$99 \text{ percentile} = 11.8$$

Soln 5) Right skewed



Mean > Mode > Median

Left skewed



Mean < Mode < Median