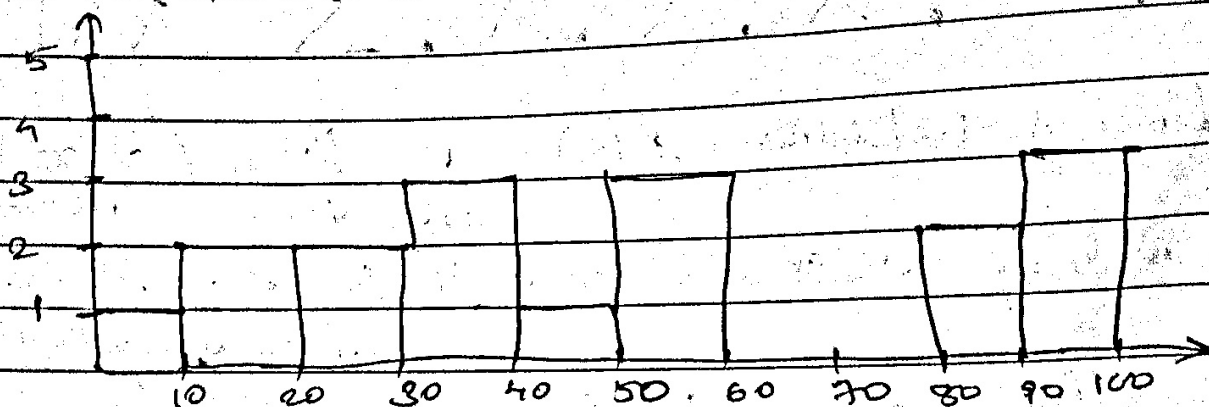


Statistics Assignment

① Plot a histogram.

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

Solⁿ



② In a Pilot 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 80% CI of the mean.

Solⁿ $\sigma = 100$, $n = 25$, $\bar{x} = 520$, $CI = 80\%$, $\alpha = 0.20$

$$\bar{x} \pm Z(\alpha/2) \frac{\sigma}{\sqrt{n}}$$

$$\Rightarrow 520 \pm Z(0.10) \frac{100}{\sqrt{25}} \Rightarrow 520 \pm (-1.28) \cdot \frac{100}{5}$$

$$\Rightarrow \text{Lower fence} = 494.4$$

$$\text{Upper fence} = 545.6$$

③ What is the value of 99th percentile?

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

Solⁿ

$$\frac{99}{100} \times (n+1) = \frac{99}{100} \times 20 = 19.8^{\text{th}} \text{ Index}$$

$$\Rightarrow (12) //$$

Q4) A car believes that the percentage of citizens in city who own a vehicle is 60% or less. A sales manager

disagrees with this. He conducted a hypothesis testing surveying 200 residents and found out 170 residents responded yes to own a vehicle.

(a) State the null and alternate hypothesis.

(b) At a 0.1 significance level, is there enough evidence to support idea that the vehicle owners is 60% or less.

Solⁿ

$$H_0 : P_0 \leq 60\%$$

$$H_1 : P_0 \neq 60\%$$

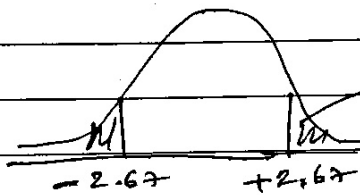
$$V_0 = 1 - P_0 = 1 - 0.6 = 0.4$$

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

$$\Rightarrow \frac{\hat{P} - P_0}{\sqrt{\frac{P_0 V_0}{n}}} = \frac{0.68 - 0.60}{\sqrt{\frac{(0.68)(0.4)}{250}}}$$

$$\Rightarrow \frac{0.08}{\sqrt{0.001088}} = \frac{0.08}{0.03} \approx 2.67$$

→



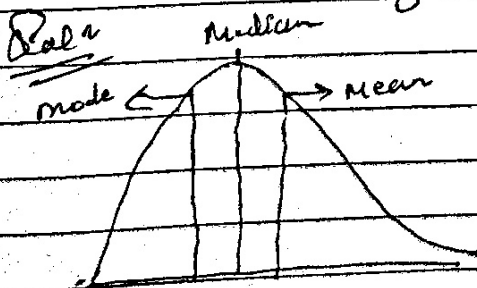
$$0.00379 \times 2 = 0.00758 \text{ (p-value)}$$

∴ p-value is less than α .

So, H_0 is rejected

Q5) In left, and right skewed data, what is the relationship between mean, median and mode?

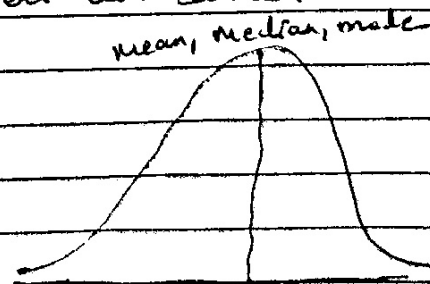
(Draw the graph to represent the same.)



(Positive skewed)

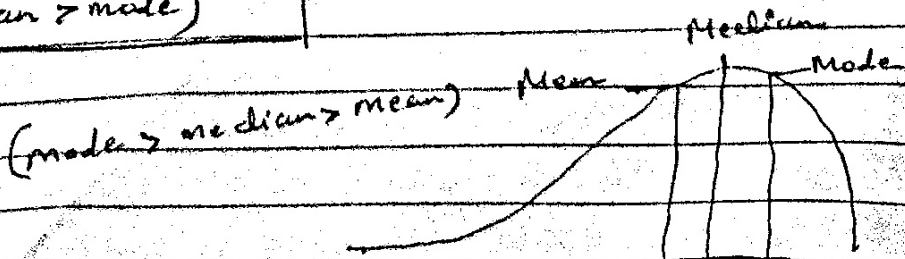
Right skewed

(mean > median > mode)



Symmetrical

mean = median = mode



(mode > median > mean)

(Left-skewed)

Negative skew