

Ch2 Q.1



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$$x_1 = 6, x_2 = 3, x_3 = 5, x_4 = 24, x_5 = 2, x_6 = 6, x_7 = 0, x_8 = 8$$

① sample mean, $\bar{x} = \frac{\sum x_i}{8} = \frac{54}{8} = \boxed{6.75}$

② sample median, sorting the data:

$$0, 2, 3, 5, 6, 6, 8, 24$$

$$n = 8 \Rightarrow 0.5(8+1) = 4.5^{\text{th}} \text{ entry}$$

$$\Rightarrow \frac{5+6}{2} = \boxed{5.5}$$

③ Mean > Median

\therefore , there is a rightward skewness in the data set.

④ Using the sorted data above,

$$\text{position of } Q_1 = 0.25(8+1) = 2.25$$

$$\Rightarrow Q_1 = 2 + 0.25(3-2)$$

$$= 2.25$$

$$\text{position of } Q_3 = 0.75(8+1) = 6.75$$

$$\Rightarrow Q_3 = 6 + 0.75(8-6) = 7.5$$

$$\therefore, \text{IQR} = Q_3 - Q_1 = 7.5 - 2.25 = \boxed{5.25}$$

⑤

Sample standard deviation

$$S = \sqrt{\frac{\sum_{i=1}^8 (x_i - \bar{x})^2}{8-1}} = \sqrt{\frac{384.68}{7}} = \boxed{7.41}$$

⑥

$$\bar{x} \pm 2S = (-8.09, 21.59)$$

$$\therefore, \text{ \%age of values b/w 2 sd's of mean} \\ = \frac{7}{8} \times 100 = 87.5\%$$

⑦

From Chebyshev's thm.,

atleast $\left(1 - \frac{1}{2^2}\right) \% = 75\%$ of the observations lie b/w 2 sd.'s of the mean

⑧

The z-score for 24 is

$$z = \frac{24 - 6.75}{7.41} = 2.32 < 3.$$

Hence, 24 is not an outlier

