

## Ch2 Q.1



Siddharth Acharya  
bmat1933

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

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

② sample median, sorting the data:

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

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

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

③ Mean > Median

∴, 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

$$S = \sqrt{\frac{\sum_{i=1}^8 (x_i - \bar{x})^2}{8-1}} = \sqrt{\frac{384.62}{7}} = \boxed{7.41}$$

$$⑥ \quad \bar{x} \pm 2s = (-8.09, 21.59)$$

$\therefore$  %age of values b/w 2 sd's of mean

$$= \frac{7}{8} \times 100 = 87.5\%$$

⑦ From Chebyshev's Thm.,

at least  $(1 - \frac{1}{k^2}) \times 100\% = 75\%$  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

