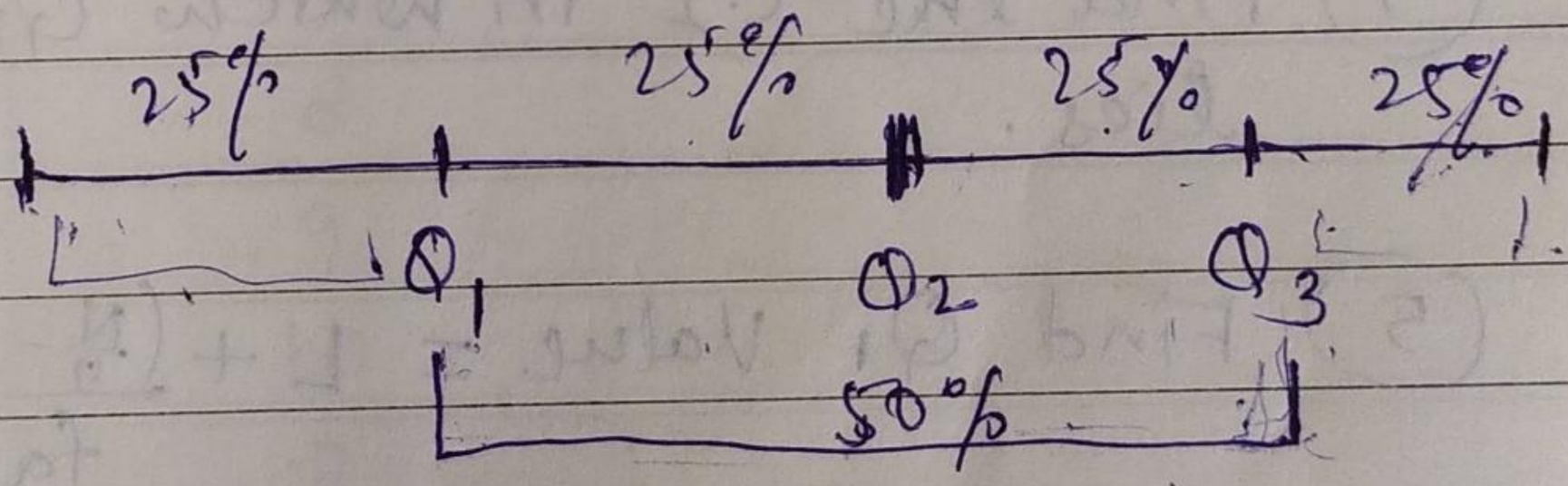
MEASURES OF VARIABILITY

Quartile Deviation.

चतुर्थांश विचलन

⇒ Improved form of Range
विस्तार विचलन का सुधरा हुआ रूप

⇒ Given importance to middle 50% scores.
मध्य के 50% अंकों को महत्व दिया जाता है।



→ Symbol denoted by 'Q'

⇒ Formula of Quartile Deviation

$$Q = \frac{Q_3 - Q_1}{2}$$

⇒ Also known as Semi Inter Quartile Range.
अर्द्ध-आन्तरिक चतुर्थांश विचलन

Calculation of Q.D. in Ungrouped data

Steps – ① Arrange the data in ascending order.

② Find N

③ Find Q_1 term $= \left(\frac{N+1}{4}\right)$

④ Find Q_1 value

⑤ Find Q_3 term $3\left(\frac{N+1}{4}\right)$

⑥ Find Q_3 value

⑦ Find $Q = \frac{Q_3 - Q_1}{2}$

Ques. Find Q from the following data

(X) 6, 8, 10, 15, 7, 12, 13, 17, 21, 19, 18

Solution :–

Step ① → 6, 7, 8, 10, 12, 13, 15, 17, 18, 19, 21

Step ② → N = 11 (odd)

Step ③ → Q_1 term $= \frac{N+1}{4} = \frac{11+1}{4} = \frac{12}{4} = 3$

Q_1 term = 3rd term

Step ④ Q_1 value = 8

$\boxed{Q_1 = 8}$

Step ⑤ Q_3 term $= 3\left(\frac{N+1}{4}\right) = 3 \times 3 = 9$th ter

Step ⑥ Q_3 value = 18

$\boxed{Q_3 = 18}$

Step ⑦

$$Q = \frac{Q_3 - Q_1}{2}$$

$$= \frac{18 - 8}{2}$$

$$= \frac{10}{2}$$

$\boxed{Q = 5}$ Ans

Ques Find Q

13, 18, 15, 8, 10, 19, 11, 20, 25, 22, 12, 16

Solution

step (1) 8, 10, 11, 12, 13, 15, 16, 18, 19, 20, 22, 25

step (2) N = 12 (even)

step (3) Q_1 term $= \frac{N+1}{4} = \frac{12+1}{4} = \frac{13}{4} = 3.25$ term

3 + 0.25

step (4) Q_1 value = 3rd term + 0.25 (4th term − 3rd)

= 11 + 0.25 (12 − 11)

= 11 + 0.25 × 1

= 11 + 0.25

$Q_1 = 11.25$

4th − 3rd

3.25

step (5) Q_3 term $= 3\left(\frac{N+1}{4}\right) = 3 \times 3.25$

Q_3 term = 9.75 th term.

step (6) Q_3 value = 9th + 0.75 (10th − 9th)

= 19 + 0.75 (20 − 19)

= 19 + 0.75 × 1

$Q_3 = 19.75$

9.75

9 − 10

step (7) $Q = \frac{Q_3 - Q_1}{2}$

$= \frac{19.75 - 11.25}{2}$

$= \frac{8.50}{2}$

$Q = 4.25$ Ans