

Quartile

$Q_1$

$Q_2$

$Q_3$

$Q_4$

25%

50%

75%

100%

$\Rightarrow Q_1$  and  $Q_3$  are more used.

25%

75%

$$Q_1 = N/4$$

$\Rightarrow$  Quartiles divide data into 4%

$$Q_3 = 3N/4$$

## Deciles

$D_1, D_2, \dots, D_{10}$

⇒ Deciles divide data into 10%

## Percentiles

$P_1, P_2, \dots, P_{100}$

Percentiles divide data into 100%

## Example (ungroup data)

Given below are the marks obtained by 9 students:  
calculate median from given data

data      Arranged form

45      32

32      36

37      36

46      37

39      39 = median (mid value)

36      41

41      45

48      46

38      48

$$\text{Median} = \bar{x} = l + \frac{h}{f} \left( \frac{n}{2} - C \right)$$

$$\bar{x} = 59.5 + \frac{10}{304} \left( \frac{905}{2} - 285 \right)$$

$$\bar{x} = 59.5 + \frac{10}{304} \left( 452.5 - 285 \right)$$

$$\bar{x} = 59.5 + \frac{10}{304} \left( 167.5 \right)$$

$$\bar{x} = 59.5 + \frac{1675}{304}$$

$$\bar{x} = 59.5 + 5.5$$

$$\bar{x} = 65 \quad \text{Ans.}$$

$$Q_1 = l + \frac{h}{f} \left( \frac{n}{4} - C \right)$$

$$Q_3 = l + \frac{h}{f} \left( \frac{3n}{4} - C \right)$$

$$D_8 = l + \frac{h}{f} \left( \frac{8n}{10} - C \right)$$

$$Q_1 = l + \frac{h}{f} \left( \frac{n}{4} - c \right)$$

$$Q_1 = 49.5 + \frac{10}{190} \left( \frac{905}{4} - 95 \right)$$

$$Q_1 = 49.5 + \frac{10}{190} (226.25 - 95)$$

$$Q_1 = 49.5 + \frac{10}{190} (131.25)$$

$$Q_1 = 49.5 + \frac{1312.5}{190}$$

$$Q_1 = 49.5 + 6.9$$

$$\boxed{Q_1 = 56.4} \text{ Ans.}$$

$$Q_3 = l + \frac{h}{f} \left( \frac{3n}{4} - c \right)$$

$$Q_3 = 59.5 + \frac{10}{304} \left( \frac{3(905)}{4} - 285 \right)$$

$$Q_3 = 59.5 + \frac{10}{304} \left( \frac{2715}{4} - 285 \right)$$

$$Q_3 = 59.5 + \frac{10}{304} (678.75 - 285)$$

$$Q_3 = 59.5 + \frac{10}{304} (393.75)$$

$$Q_3 = 59.5 + \frac{3937.5}{304}$$

$$Q_3 = 59.5 + 12.95$$

$$\boxed{Q_3 = 72.45} \quad \text{Ans.}$$

$$D_8 = l + \frac{h}{f} \left( \frac{8n}{10} - c \right)$$

$$D_8 = 69.5 + \frac{10}{211} \left( \frac{8(905)}{10} - 589 \right)$$

$$D_8 = 69.5 + \frac{10}{211} \left( \frac{7240}{10} - 589 \right)$$

$$D_8 = 69.5 + \frac{10}{211} (724 - 589)$$

$$D_8 = 69.5 + \frac{10}{211} (135)$$

CS Scanned with CamScanner

$$D_8 = \frac{69.5 + 1350}{211}$$

$$D_8 = 69.5 + 6.39$$

$$D_8 = 75.89 \quad \text{Ans}$$