Partition Values

These are the values which divided the series into a number of equal parts. Hence the positional values which divide the ordered data into different number of equal parts are median - divides data into two equal parts
Quartiles - divides the data into four equal parts
Deciles - divides the data into ten equal parts
percentiles - divides into hundred equal parts.

• Quartiles

These are three quartiles ie., Q_1, Q_2 and Q_3 are termed as first quartile, second quartile and third quartile or lower quartile, middle quartile and upper quartile, respectively.

The first quartile Q_1, separates the

8.00 first one-fourth of the data from the upper three-fourths and is equal to the 25th
9.00 percentile. The Second quartile Q_2 divides the data into two equal parts (like median)
10.00 and is equal to the 50th percentile. The third quartile Q_3 separates the first three
11.00 quarters of the data from the last quarter and is equal to 75th percentile.
12:00
The first quartile, Q_1 is the value
1.00 which exceed 25% of the observations and is exceeded by 75% of the observations. The
2.00 second quartile Q_2, coincides with median. The third quartile Q_3, is the point which has 75% observations before it and 25% observations after it.

Deciles

Deciles are the partition values which divide the arranged data into ten equal parts. There are nine deciles i.e., $D_1, D_2, D_3 \ldots D_9$ and 5th decile is same as median or Q_2 because it divides the data in two equal parts.

12.00

• Percentiles

1.00

Percentiles are the values which divide the arranged data into hundred equal parts. There are 99 percentile ie, $P_1, P_2, P_3, \ldots, P_{99}$. The 50^{th} percentile divides the series into two equal parts and $P_{50} = D_5 =$ median.

5.00 Similarly the value of $Q_1 = P_{25}$ and value of $Q_3 = P_{75}$.

Partition Values for raw data

Let $x_1, x_2, \ldots, x_n$ be the given set of data. first arrange the data into increasing order. Then the i^{th} decile D_i = the observation in the $\left[\frac{i(n+1)}{10}\right]^{th}$ position.

The i^{th} percentile P_i = The observation in the $\left[\frac{i(n+1)}{100}\right]^{th}$

32) Calculate the 5^{th} decile and 45^{th} percentile of the following values.

65, 70, 100, 33, 85, 52, 45, 17, 5

08 Sunday
15th Week 098 - 267 days

⟹ Writing the observation ascending order.

5, 17, 33, 45, 52, 65, 70, 85, 100.

D_5 = Size of $\left(\frac{5(9+1)}{10}\right)^{th}$ item

= Size of 5^{th} item = 52

P_{45} = Size of $\left(\frac{(9+1)5}{100}\right)^{th}$ item

= Size of 4.5^{th} item

$= 4^{th}$ item $+ 0.5(5^{th} - 4^{th})$

$= 45 + 0.5(52 - 45) = 45 + 3.5 = 48.5$

Partition Values for ungrouped frequency table

Let $x_1, x_2, \ldots, x_n$ are the observations $f_1, f_2, \ldots f_n$ are the corresponding frequencies. Arrange the table in ascending order. Prepare LCFT. The value of observation coming as the $\left(\frac{iN}{10}\right)^{th}$ in order of magnitude from the cumulative frequency column. is the i^{th} decile D_i. Similarly P_i is the size of $\left(\frac{iN}{100}\right)^{th}$ cumulative frequency.

83). find 7^{th} decile and 86^{th} percentile. for the following data.

Value	:	5	8	10	12	19	20	32
Frequency	:	3	10	15	20	8	7	6

→

Value	f	LCF
5	3	3
8	10	13
10	15	28
12	20	48
19	8	56
20	7	63
32	6	69
	N=69	

$D_7 = \frac{7 \cdot N}{10} = \frac{7}{10} \cdot 69$

$= 7 \times 6.9 = 48.3$

The c.f greater than 48.3 is 56 thus $D_7 = 19$

8.00 $P_{86} = \frac{86}{100} \cdot N = \frac{86}{100} \cdot 69 = 86 \times 0.69$

9.00 $= 59.34.$

10.00 The CF greater than 59.34 is 63. thus

11.00 $P_{86} = 20$