QUARTILE DETERMINATION (FROM GEOGRAPHICAL DATA)

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Quartiles are values that divide a given data series into **four equal parts**. There are **3 quartiles**:

- **First Quartile/Lower Quartile- Q1**
- **Second/Middle Quartile/Median- Q2**
- **Third/Upper Quartile- Q3**

➡The data below represents rainfall figures in inches for the **month of January** from **1946 to 1965**

YEAR	AMOUNT OF RAINFALL(INCHES)
1946	0.00
1947	0.84
1948	1.88
1949	0.95
1950	0.58
1951	0.52
1952	0.03
1953	0.85
1954	0.70
1955	4.20
1956	0.30
1957	0.98
1958	0.40
1959	1.73
1960	0.30
1961	0.94
1962	0.07
1963	0.12
1964	0.1
1965	0.00

- **STEP 1: Arrange the data into ascending order (smallest to largest)**

OBSERVATION	RAINFALL AMOUNT
1	0
2	0
3	0.03
4	0.07
5	0.1
6	0.12
7	0.3
8	0.3
9	0.4
10	0.52
11	0.58
12	0.7
13	0.84
14	0.85
15	0.94
16	0.95
17	0.98
18	1.73
19	1.88
20	4.2

Here, Total No. of Observations (**n**) is 20 as the data is given for 20 years (1946 to 1965)

Table No. 1

Quartile Rank	Sl No.	Data Series	Quartile Value
	1	0	
	2	0	
	3	0.03	
	4	0.07	
5.25 →	5	0.1	Q1 ←
	6	0.12	
	7	0.3	
	8	0.3	
	9	0.4	
10.5 →	10	0.52	Q2 ←
	11	0.58	
	12	0.7	
	13	0.84	
	14	0.85	
15.75 →	15	0.94	Q3 ←
	16	0.95	
	17	0.98	
	18	1.73	
	19	1.88	
	20	4.2	

• STEP 2: Write down the formulae for determining the Quartile values and find out the values

Rank of Q1= (n+1)/4th observation

= (20+1)/4th observation

= 21/4th observation= **5.25th observation**

5.25th observation is found between 5th observation and 6th observation (see table no.1)

5th observation has value 0.1 and 6th observation has value 0.12

Q1 value should lie between 0.1 and 0.12

Therefore, Q1 value has to be determined using simple interpolation

$$\frac{5.25-5}{6-5} = \frac{Q1-0.1}{0.12-0.1}$$

$$\frac{0.25}{1} = \frac{Q1-0.1}{0.02}$$

0.25*0.02 = 1*(Q1-0.1)

0.005 = Q1- 0.1

0.005 + 0.1 = Q1

0.105= Q1

Q1= 0.105 inches

Rank of Q2= 2(n+1)/4th observation= (n+1)/2th observation

= (20+1)/2th observation

=21/2th observation=**10.5th observation**

10.5th observation is found between 10th observation and 11th observation (see table no.1)

10th observation has value 0.52 and 11th observation has value 0.58

Q2 value should lie between 0.52 and 0.58

Therefore, Q2 value has to be determined using simple interpolation

10.5-10 = Q2- 0.52

11-10 0.58-0.52

0.5 = Q2- 0.52

1 0.06

0.5*0.06 = 1*(Q2-0.52)

0.03 = Q2- 0.52

0.03+0.52= Q2

0.55 = Q2

Q2= 0.55 inches

Rank of Q3= 3(n+1)/4th observation

= 3(20+1)/4th observation

= 3*21/4th observation=**15.75th observation**

15.75th observation is found between 15th observation and 16th observation (see table no.1)

15th observation has value 0.94 and 16th observation has value 0.95

Q3 value should lie between 0.94 and 0.95

Therefore, Q3 value has to be determined using simple interpolation

15.75-15 = Q3-0.94

16-15 0.95-0.94

0.75 = Q3-0.94

1 0.01

0.75*0.01 = 1*(Q3-0.94)

0.0075 = Q3-0.94

0.9475 = Q3

Q3= 0.9475 inches