

fs4u

Cumulative Frequency

‘How To’ Booklet 32

Cumulative Frequency

This section covers the cumulative frequency table, the graph to show the cumulative frequency, the median, the upper and lower quartiles and finally the inter-quartile range.

Example

Marks from an examination of 100 pupils are displayed in the table below.

Marks	Number of pupils (frequency)
0-10	1
11-20	3
21-30	12
31-40	25
41-50	31
51-60	18
61-70	9
71-80	1
total	100

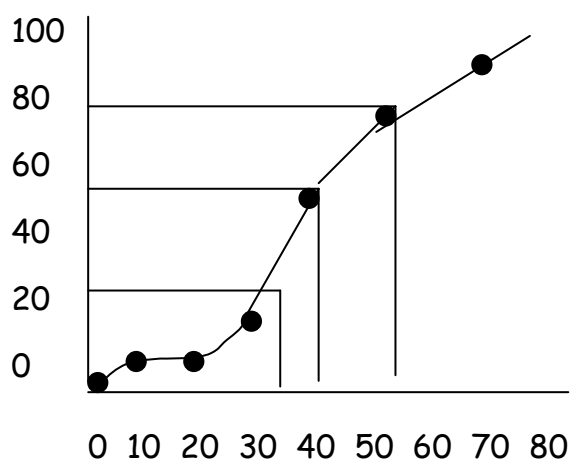
(Model Interval)

To obtain the cumulative frequency we need to know, for example, how many pupils scored 40 marks or less i.e. $1 + 3 + 12 + 25 = 41$.

Marks	Cumulative frequency	
less than 10	1	1
less than 20	1+3	4
less than 30	1+3+12	16
less than 40	1+3+12+25	41
less than 50	1+3+12+25+31	72
less than 60	1+3+12+25+41+18	90
less than 70	1+3+12+25+41+18+9	99
less than 80	1+3+12+25+41+18+9+1	100

Now plot your curve

Cumulative frequency ALWAYS goes up the vertical axis and the other quantity in this case 'marks' goes along the horizontal axis.



From the graph

Median (half way up the cumulative frequency axis i.e. from 50)
Median Mark = 42

Lower Quartile (one quarter then up i.e. from 25)
Lower Quartile Mark = 34

Upper Quartile (three quarters then up i.e. from 75)
Upper Quartile Mark = 51

Inter-quartile Range = Upper quartile – lower quartile = 51 – 34
Inter-quartile Range = 17

Activity

A class of 20 pupils obtained the following marks out of 50 in a test.

29	25	23	21	18
12	3	34	48	37
38	42	46	24	5
25	32	16	36	27

Copy and complete the following table

Marks	Tally	Frequency
0 – 10	II	2
11 – 20	III	3
21- 30		
31 – 40		
41 – 50		
	Total	20

Copy and complete the following cumulative frequency table

Cumulative Frequency (32)

Marks	Cumulative Frequency
less than 10	2
less than 20	5
less than 30	
less than 40	
less than 50	

Draw a cumulative frequency curve from your completed table.

From your curve find the following:--

- a) the median mark
- b) the upper quartile
- c) the lower quartile
- d) the inter-quartile range
- e) the modal interval