Tutorial 19 : Frequency distribution, graphical representations, central tendency and dispersion

1.   Give the class boundaries for the following classes:

Class
1 – 10
11- 20
21 – 30

2.   Give the **less-than** cumulative frequency table

Class	Frequency
1 – 10	3
11 – 20	6
21 – 30	2

3.   Give the **more-than** cumulative frequency table

Class	Frequency
1 – 10	3
11 – 20	6
21 – 30	2

4.   Set up a frequency table by filling in the frequency for the data and class intervals below:

```
1    3  9      24     30     13
10   11 12     12     15     18
21   27 28     15     28     3
```

Class	Frequency
1 - 10	
11 - 20	
21 - 30	

5.   Draw a histogram for the frequency table below:

Class	Frequency
$0 < x \le 10$	3
$10 < x \le 20$	5
$20 < x \le 30$	8
$30 < x \le 40$	12
$40 < x \le 50$	6
$50 < x \le 60$	3
$60 < x \le 70$	2

6. Draw a cumulative frequency polygon for the cumulative frequency table below:
    Find the median and the inter-quartile range of the data.

Less than or equal to	Cumulative frequency
0	0
10	3
20	8
30	16
40	28
50	34
60	37
70	39

7. The Hong Kong unemployment rate in the year of 4/2001 – 5/2002 was as following:

4/2001	4.5
5/2001	4.5
6/2001	4.5
7/2001	4.7
8/2001	4.9
9/2001	5.3
10/2001	5.5
11/2001	5.8
12/2001	6.1
1/2002	6.7
2/2002	6.8
3/2002	7.0
4/2002	7.1
5/2002	7.4

    Calculate the average, median, and mode of unemployment rate:
    a)   For 4/2001 – 12/2001
    b)   For1/2002 – 5/2002
    c)   For all 14 months.

8. Find the mean, median, mode of the following:
        10, 13, 14, 14, 14, 15, 15,16, 17, 22

9. The temperature in degree Celsius each day cover a three week period were follow:
        17, 18, 20, 21, 19, 16, 15, 18, 20, 21, 21,,22, 21, 19, 20,19, 17,16,16,17.
    Compute the mean, median, and mode of these raw dates by using two-degree intervals
    starting with 15-16.
    a)   Draw a cumulative frequency polygon.
    b)   Find the range, inter-quartile range and quartile deviation

Activity

Raw data

21	20	14	19	23	32	28	24
26	47	26	15	40	16	22	24
36	18	18	17	17	17	48	24

Grouping

5 - 9	
10 - 14	
15 - 19	
20 - 24	
25 - 29	
30 - 34	
35 - 39	
40 - 44	
45 - 49	

Use Excel - Tools - Data analysis

To find :   1. Frequency table according to the table.

                     2. Its histogram.

                     3. Cumulative frequency table

                     4. Cumulative frequency polygon

Solution to Tutorial 21

1.

Class	Class boundaries
1 – 10	0.5 – 10.5
11- 20	10.5 – 20.5
21 – 30	20.5 – 30.5

2.

Less than	Cumulative frequency
0.5	0
10.5	3 = 0+3
20.5	9 = 3+6
31.5	11 = 9+2

3.

More than	Cumulative frequency
0.5	11
10.5	8 = 11-3
20.5	2 = 8-6
31.5	0 = 2-2

4.

Class	Frequency
1 - 10	5
11 - 20	7
21 - 30	6

5.

Histogram

6.

Cumulative frequency polygon

Frequency (y-axis): 0, 5, 10, 15, 20, 25, 30, 35, 40

Less than (x-axis): 10, 20, 30, 40, 50, 60, 70, 80
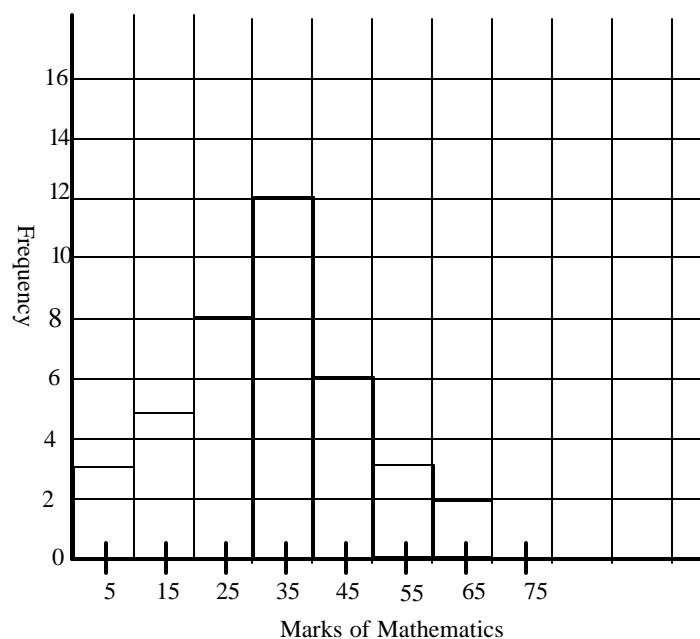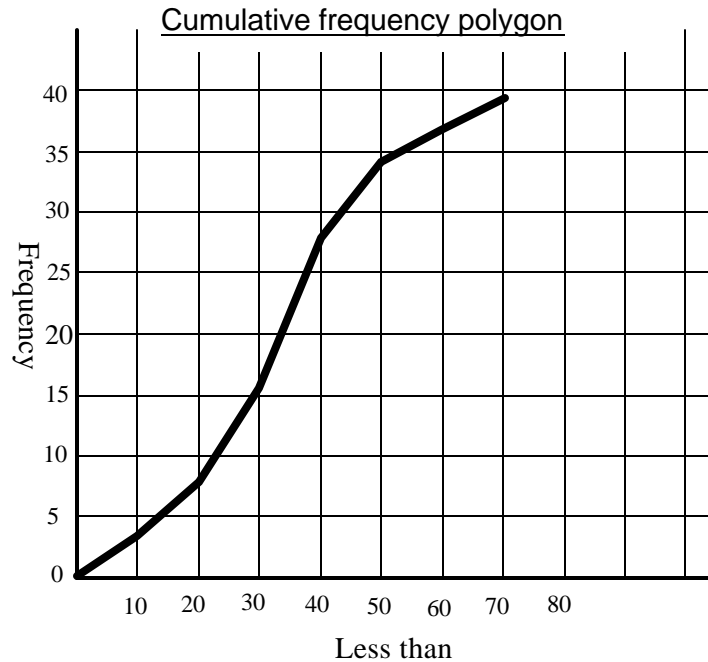
7. a)   mean = 5.09   median = 4.9   mode = 4.5
    b)   mean = 7   median = 7   mode = undefined
    c)   mean = 5.77   median = 5.65   mode = 4.5

8. mean = 15   median = (14+15)/2 = 14.5   mode = 14

9.

Temperature (?)	Tally	Frequency f	Class mark x	$f\,x$
15 – 16	////	4	15.5	62.0
17 – 18	##	5	17.5	87.5
19 – 20	//// /	6	19.5	117.0
21 – 22	##	5	21.5	107.5
23 – 24	/	1	23.5	23.5
Sum		21		397.5

Temperature (?)	cumulative frquency
< 14.5	0
< 16.5	4
< 18.5	9
< 20.5	15
< 22.5	20
< 24.5	21

The mean temperature = 397.5/21 = 18.9 ?
The modal class of temperature is 19 – 20 ?
The rank of median
$$= ½×21 = 10.5$$
The median temperature is 19 ?

The rank of upper quartile
$$= ¾×21 = 15.75$$
$$= 16 \text{ , to the nearest integer}$$
The upper quartile Q_3 is 21?

The rank of lower quartile
$$= ¼×21 = 5.25$$
$$= 5 \text{ , to the nearest integer}$$
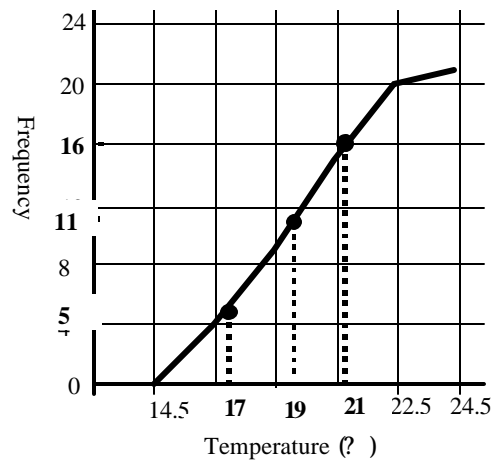The lower quartile Q_1 is 17? .

The inter-quartile range = $Q_3 - Q_1$
$$= 21 - 17$$
$$= 4?$$

Quartile deviation = $½(Q_3 - Q_1)$
$$= ½(21 - 17) = 2$$

Less than Cumulative frequency polygon
for temperature

Temperature (?)

Activity

Bin	Frequency	Cumulative %	Cumulative frequency
9	0	.00%	0
14	1	4.17%	1
19	8	37.50%	9
24	7	66.67%	16
29	3	79.17%	19
34	1	83.33%	20
39	1	87.50%	21
44	1	91.67%	22
49	2	100.00%	24
More	0	100.00%	

Histogram