

Class Intervals

When a set of data is large, the numbers have to be grouped into "class intervals."

- Each interval must have the same **number** of values.
- Ideally, there should be between 6 and 10 intervals.

Example :- The test scores of a group are to be entered into a frequency table. (The first 6 have been done)

~~12~~ ~~23~~ ~~41~~ ~~55~~ ~~77~~ ~~15~~ 32 40
 51 69 21 12 16 43 56 71
 32 75 34 42 55 76 21 73
 22 56 41 19 20 47 78 17

Can you see that there are **7 class intervals** and each interval contains 10 numbers ?

Class Intervals	Tally	Frequency
10 - 19		
20 - 29		
30 - 39		
40 - 49		
50 - 59		
60 - 69		
70 - 79		

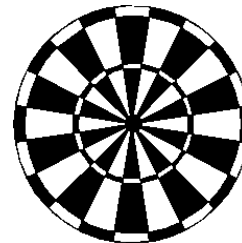
Exercise 2

- Copy and complete the frequency table above.
 - How many students scored over 49 ?
 - Draw a neat labelled **bar graph** to show this information.



- Each number below shows the score of 3 darts thrown by each member of class 1A₃.

15 13 31 42 64 34 32 20 11 8 21
 55 19 51 45 64 35 75 50 46 55 67
 21 33 12 6 40 79 76 47 29 10 15



- How many numbers are in each interval ?
- How many intervals will there be in the table ?
- Copy and complete the table.
- How many pupils are in class 1A₃ ?
- How many pupils scored under 30 ?
- Draw a neat labelled bar graph showing this information.

Class Intervals	Tally	Frequency
0 - 9		
10 - 19		
20 - 29		
30 - 39		
40 -		

- The number of pets in each class in a school is shown below.

1 14 8 27 16 7 12 15 21 20 17 0 11 15 10
 12 14 4 5 10 14 11 9 19 15 21 13 4 11 16

Show this information on a frequency table. (Use class intervals of 0 - 4, 5 - 9, 10 - 14, etc)

4. A class were asked to tidy their bedrooms and say how many coins they found !

The number of coins found by each pupil is shown.

- (a) Find the range.
 (b) Which of these would be the best class interval to start with : -
 (0 - 9) or (0 - 3) or (0 - 4) or (0 - 2) ?
 (c) Construct a frequency table using your chosen class interval.
 (d) Draw a neat labelled bar graph to show this information.



4	3	18	15	31	9	0	2
11	6	27	15	12	11	15	4
22	15	16	26	25	17	13	3
9	7	1	9	16	7	21	10
12	20	1	14	19	3	0	12

5. A list of waiting times (in minutes) in a doctors surgery are shown.



- (a) Find the range.
 (b) Which of these would be the best class interval to use : -
 (0 - 9) or (0 - 1) or (0 - 4) or (0 - 3) ?
 (c) Construct a frequency table showing this information.

0	4	22	11	11	19	10	12
5	8	26	25	15	17	18	2
20	13	19	21	22	13	23	13
8	9	1	6	26	8	18	10
14	10	3	24	17	5	3	22

6. For each table below, construct a frequency table using an appropriate class interval.

(a)

14	13	18	15	11	9	4	1
15	34	32	25	12	16	15	14
9	15	18	25	25	19	14	3
9	8	2	7	16	27	23	20
22	20	11	13	16	30	4	22

(b)

10	35	28	45	71	69	50	42
11	36	27	15	62	72	65	54
42	35	26	16	25	37	43	53
69	52	47	31	29	19	47	31
20	12	60	51	24	49	43	40

(c)

127	152	163	174	101	133	167	155	171	110	117	129
111	134	125	164	115	122	150	160	129	144	141	153
130	128	166	154	122	169	140	151	163	162	100	174

(d)

3.6	2.3	4.6	1.7	5.6	4.2	1.1	4.0	5.2	6.3	6.9	4.1
2.5	2.8	1.3	2.5	6.6	5.1	1.4	4.6	2.2	3.3	5.1	0.4
5.0	2.9	4.3	2.1	5.4	4.6	5.3	6.1	2.2	5.7	5.8	1.3

Mean from a Frequency Table

When given a frequency table, adding a third column will help us find the total number of items and the **mean**.

This table shows the number of coins in the pockets of some children.

$$\Rightarrow \text{Mean number of coins} = \frac{40}{16} = 2.5$$

Each pupil has an "average" of 2.5 coins.

No. of coins (x)	Freq (f)	$f \times x$
1	5	$1 \times 5 = 5$
2	5	$2 \times 5 = 10$
3	1	$3 \times 1 = 3$
4	3	$4 \times 3 = 12$
5	2	$5 \times 2 = 10$
TOTALS	16	40

Total pupils

Total coins

Exercise 3



1. This table shows the results from a group of students who were asked how many pens they carried to college.

- Copy and complete the table.
- How many students were asked?
- How many pens in total were there?
- Calculate the mean number of pens.



No. of pens (x)	Freq (f)	$f \times x$
0	1	$0 \times 1 = 0$
1	7	$1 \times 7 = \dots$
2	12	$2 \times \dots = \dots$
3	5	$\dots \times \dots = \dots$
4	5	$\dots \times \dots = \dots$
...

2. The table shows the number of goals scored by a school football team each week.

- Copy and complete the frequency table.
- Find the total number of games.
- Find the total number of goals scored.
- Calculate the mean number of goals.



No. of goals (x)	Freq (f)	$f \times x$
0	4	
1	6	
2	10	
3	3	
4	2	
...

3. Copy and complete each of the following tables, add a third column and calculate the mean.

(a)

No. of cars (x)	Freq (f)
1	7
2	10
3	5
4	2
5	6

(b)

No. of sides (x)	Freq (f)
3	2
4	8
5	3
6	5
7	1
8	1

(c)

No. of runs (x)	Freq (f)
5	2
6	7
7	3
8	5
9	1
10	1
11	0
12	1

4. Look at the tables in question 3.

Question (a) has range $(5 - 1) = 4$. Question (b) has range $(8 - 3) = 5$.

Find the range for 3 (c).

5. Shown are the test scores of class 1A₂.

(a) How many pupils are in class 1A₂?

(b) Find the range of scores.

(c) Find the mean score for class 1A₂.

(d) Can you find the median from this table?

(Hint : it is the middle number from 10, 12, 12, 12, 12, 14...).



Test score (x)	Freq (f)
10	1
12	4
14	10
16	5
18	5

6. A group of 18 year old girls were asked how old they were when they went out on their first "date".

The results are shown in this bar graph.

(a) Form a frequency table from the information in the bar graph.

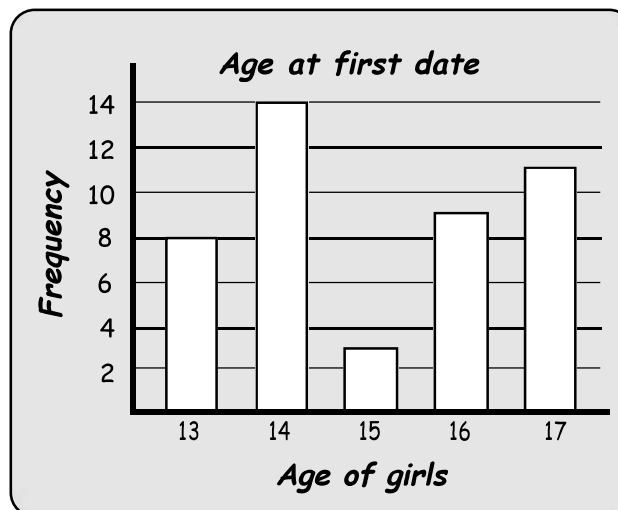
(b) Calculate the :-

(i) mode

(ii) range

(iii) mean

(iv) median.



Cumulative Frequency Tables

This frequency table shows the number of eggs laid by a clutch of chickens each day over a seven day period.

A third column has been added to keep a running total.

This makes it easier to get the total number of items.

Other information can be more easily obtained from this column.

e.g. 12 eggs had been collected by day four.
(The **cumulative frequency** on day 4 is 12).

Day	Frequency (no. collected)	Cumulative freq. (total so far)
1	2	2
2	3	5
3	1	6
4	6	12
5	5	17
6	8	25

Median :- If 29 eggs were collected altogether, then the 15th egg must be the **median**.
(14 eggs either side of this 15th egg).

=> The 15th egg (median) was collected on day 5.

Exercise 4

1. A hospital noted the number of cases of a specific viral infection.
The results are shown in the frequency table.



- Copy and complete the table.
- How many patients in total were there ?
- How many patients had been infected by the end of week 5 ?
- Which week was the infection at its worst ?
- Find the median.

Week	Frequency (no. of cases)	Cumulative freq. (total so far)
1	4	4
2	9	13
3	11	...
4	24	...
5	16	...
6	7	...
7	2	...

2. For each of the frequency tables below :-
(i) add a cumulative frequency column (ii) find the median.

(a)

Pets	Frequency
0	2
1	11
2	17
3	8
4	4
5	2
6	1

(b)

Grade	Frequency
0	1
1	3
2	4
3	10
4	21
5	7
6	4

(c)

No.	Frequency
10	7
11	7
12	10
13	20
14	15
15	20
16	5