

## Mean average from a frequency table

### Starter

1. (Review of last lesson) Find the mode and median for this data:

Mark	50	100	150	200	250	300
Frequency	9	6	2	5	3	4

### Notes

A frequency table is a convenient way to collate data when there are lots of values.

This table shows the number of mobile phones owned by a group of families.

Number of mobile phones	0	1	2	3	4
Frequency	4	8	5	2	1

If we had to write out all the without the table it would take ages, especially if the frequencies were higher:

i.e. 0, 0, 0, 0, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 2, 2, 2, 2, 2, 3, 3, 4.

The following method calculates the mean without having to write out all the values.

### Success criteria – finding the mean from a table

1. Find the total of the values by multiplying whatever you are measuring by the frequency. (This would be equivalent to adding up all the data values).  
It is a good idea to add another row or column to your table.

**E.g.** This step finds out the total number of mobile phones.

<b>Number of mobile phones:</b>	0	1	2	3	4
<b>Frequency:</b>	4	8	5	2	1
<b>Frequency × mobile phone:</b>	0 × 4	1 × 8	2 × 5	3 × 2	4 × 1

$$\text{Total number of mobile phones} = 0 + 8 + 10 + 6 + 4 = 28$$

i.e. the group of families have a total of 28 mobile phones between them

2. Find the total frequency by adding the numbers up in the frequency row (or column). (This is the same as counting how many data values there are).

**E.g.**  $4 + 8 + 5 + 2 + 1 = 20$

i.e. we have data for 20 families

3. Divide the first number we found by the second number i.e. in our example, divide the total number of mobile phones by the total number of families

**E.g.**  $\text{Mean} = \frac{28}{20} = 1.4$

So the mean average number of phones per family is 1.4

**E.g. 1** The data table below shows the weight of eggs laid at a farm on a particular day. Calculate the mean average.

Weight	70 g	80 g	90 g	100 g	110 g	120 g
Frequency	2	7	9	11	8	3

**Working:** Mass of all eggs =  $(70 \times 2) + (80 \times 7) + (90 \times 9) + (100 \times 11) + (110 \times 8) + (120 \times 3)$   
 $= 3850$   
Total frequency =  $2 + 7 + 9 + 11 + 8 + 3 = 40$  eggs  
Mean =  $\frac{3850}{40} = 96.25$  grams per egg

**E.g. 2** The table below shows the number of goals in a series of matches one weekend. Calculate the average number of goals per game.

Number of goals	0	1	2	3	4	5
Frequency	1	3	4	5	3	2

**Range from a frequency table**

Look at the first row or column (i.e. not the frequency) and subtract the smallest value from the largest value.

Number of mobile phones	0	1	2	3	4
Frequency	4	8	5	2	1

From the table above the range is  $4 - 0 = 4$ .

**E.g. 3** State the range of this data.

Weight	70 g	80 g	90 g	100 g	110 g	120 g
Frequency	2	7	9	11	8	3

**E.g. 4** The table shows the results of a survey on the number of occupants per car.

Number of occupants	1	2	3	4
Number of cars	7	11	7	$x$

- (a) If the mean number of occupants is  $2\frac{1}{3}$ , find  $x$ .
- (b) If the mode is 2, find the largest value of  $x$ .
- (c) If the median is 2, find the largest value of  $x$ .

**Video:** [Mean from frequency tables](#)

[Solutions to Starter and E.g.s](#)

### Exercise

9-1 class textbook: p472 M14.3 Qu 1-6  
A\*-G class textbook: p427 M14.3 Qu 1-4  
9-1 homework book: p162 M14.3 Qu 1-4  
A\*-G homework book: p119 M14.3 Qu 1-3

### Summary

Success criteria — finding the mean from a table:

1. Find the total of the values by multiplying whatever you are measuring by the frequency.
2. Find the total frequency by adding the numbers up in the frequency row (or column).
3. Use the formula:  $\text{Mean} = \frac{\text{Sum of (value} \times \text{frequency)}}{\text{Total frequency}}$ .

Range from a frequency table — look at the first row or column (i.e. not the frequency) and subtract the smallest value from the largest value.