



eClassroom

GCSE Mathematics

Averages from Frequency Tables

Questions

Pearson Edexcel GCSE & iGCSE Mathematics

Section A — Foundation

Worked Examples

[Fluency]

Find the mean from the frequency table.

Score (x)	1	2	3	4	5
Frequency (f)	3	7	12	8	5

$$\text{Mean} = \frac{\sum fx}{\sum f} = \frac{1 \times 3 + 2 \times 7 + 3 \times 12 + 4 \times 8 + 5 \times 5}{35} = \frac{110}{35} \approx 3.14$$

[Reasoning]

Find the modal class and estimate the mean from the grouped table.

Time (mins)	0–9	10–19	20–29	30–39	40–49
Frequency	4	8	15	10	3

Modal class = **20–29** (highest frequency)

$$\text{Mean} \approx \frac{4.5 \times 4 + 14.5 \times 8 + 24.5 \times 15 + 34.5 \times 10 + 44.5 \times 3}{40} = \frac{980}{40} = 24.5$$

[Problem Solving]

Find the median class from the grouped frequency table above.

Total = 40. Median position = 20th value.

Cumulative frequencies: 4, 12, 27, 37, 40

20th value falls in class **20–29**

[Fluency]

1.

Score (x)	1	2	3	4	5
Frequency (f)	3	7	12	8	5

- Find the mean. (3)
- Find the median. (2)
- Write down the mode. (1)

(6 marks)

**[Fluency]**

2.

Number of siblings	0	1	2	3	4
Frequency	5	12	8	4	1

Find the mean number of siblings. Give your answer to 2 decimal places.

(3 marks)

[Fluency]

3.

Goals scored	0	1	2	3
Frequency	8	5	4	3

- (a) Write down the mode. (1)
 (b) Find the median. (2)
 (c) Find the mean. (3)

(6 marks)

[Reasoning]

4.

Age (years)	10–19	20–29	30–39	40–49
Frequency	4	8	15	

- (a) Write down the modal class. (1)
 (b) Write down the median class. (2)
 (c) Estimate the mean. Give your answer to 1 d.p. (3)

(6 marks)

[Reasoning]

5.

Time (mins)	0–9	10–19	20–29	30–39	40–49
Frequency	4	8	15	10	3

- (a) Write down the modal class. (1)
 (b) Find the median class. (2)
 (c) Estimate the mean. (3)

(6 marks)

[Reasoning]

6.

The mean from a frequency table of 5 scores is 3.2.

Score (x)	1	2	3	4	5
Frequency (f)	2	a	6	b	3

The total frequency is 20. Find the values of a and b.

(4 marks)

[Problem Solving]

7.

Height (cm)	150–159	160–169	170–179	180–189
Frequency	6	14	18	12

Estimate the mean height. Give your answer to 1 decimal place.

(3 marks)

[Problem Solving]

8.

Explain why we can only **estimate** the mean from a grouped frequency table, rather than calculate it exactly.

(2 marks)

Section B — Higher

Worked Examples

[Fluency]

Estimate the median from the grouped frequency table.

Value	$0 < x \leq 10$	$10 < x \leq 20$	$20 < x \leq 30$	$30 < x \leq 40$
Frequency	6	14	18	12

Total = 50. Median at 25th value. Cumulative: 6, 20, 38

$$\text{Median} \approx 20 + \frac{25 - 20}{18} \times 10 = 20 + 2.78 \approx 22.8$$

[Reasoning]

The mean of a grouped table is known. Find a missing frequency.

Use: $\sum fx = \text{mean} \times \sum f$, then solve for the unknown.

[Problem Solving]

Compare estimated mean with true mean — why do they differ?

We use midpoints as representatives of each class. The true values within each class are unknown, so the estimate has rounding error.

[Fluency]

1.

Value	$0 < x \leq 10$	$10 < x \leq 20$	$20 < x \leq 30$	$30 < x \leq 40$
Frequency	6	14	18	12

- (a) Estimate the mean. (3)
 (b) Estimate the median using interpolation. (3)

(6 marks)

[Fluency]

2.

Mass (kg)	0–10	10–20	20–30	30–40	40–50
Frequency	3	9	15	8	5

- (a) Estimate the mean mass. (3)
 (b) Estimate the median mass using interpolation. (3)

(6 marks)

[Reasoning]

3.

Score	0–19	20–39	40–59	60–79	80–99
Frequency	2	p	14	q	4

The total frequency is 40 and the estimated mean is 52.

Find the values of p and q.

(5 marks)

[Reasoning]

4.

Time (s)	$0 < t \leq 20$	$20 < t \leq 40$	$40 < t \leq 60$	$60 < t \leq 80$
Frequency	8	12	15	5

- (a) Estimate the mean. (3)
 (b) Estimate the median using interpolation. (3)
 (c) Compare the mean and median. What does this suggest about the distribution? (2)

(8 marks)

[Problem Solving]

5.

Length (cm)	0–4	5–9	10–14	15–19	20–24
Frequency	3	7	12	6	2

- (a) Write down the modal class. (1)
 (b) Estimate the mean. (3)
 (c) Explain why the mean can only be estimated. (1)

(5 marks)

[Problem Solving]

6.

Two classes take the same test. The results are summarised:

Class	Modal class	Estimated mean	Median class
A	40–59	52.4	40–59
B	60–79	61.8	60–79

Write two comparisons of the performance of the two classes.

(4 marks)