# Averages

A collection of 9-1 Maths GCSE Sample and Specimen questions from AQA, OCR, Pearson-Edexcel and WJEC Eduqas.

| Name: | |
|---|---|
| Total Marks: | |

1. Hardeep asks 25 people how many portions of fruit and vegetables they ate yesterday.

   The results are shown in this table.

(a)  Calculate the mean number of portions.

| Number of portions | Frequency | |
|---|---|---|
| 4 | 4 | |
| 5 | 6 | |
| 6 | 8 | |
| 7 | 5 | |
| 8 | 2 | |

.................................. [3]

(b)  Hardeep ate no portions of fruit and vegetables yesterday. He decides to include this in his results.

   Explain how this will affect:
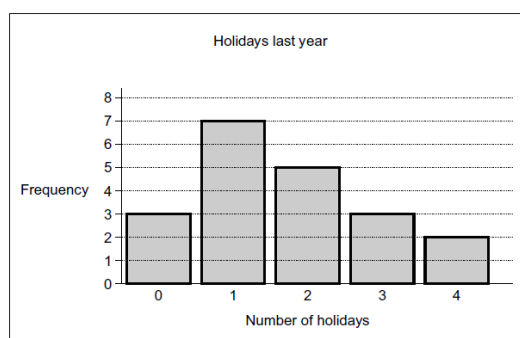
   (i) the mode,

[1]

   (ii) the range.

[1]

2. Noelle asks her friends how many holidays they had last year.
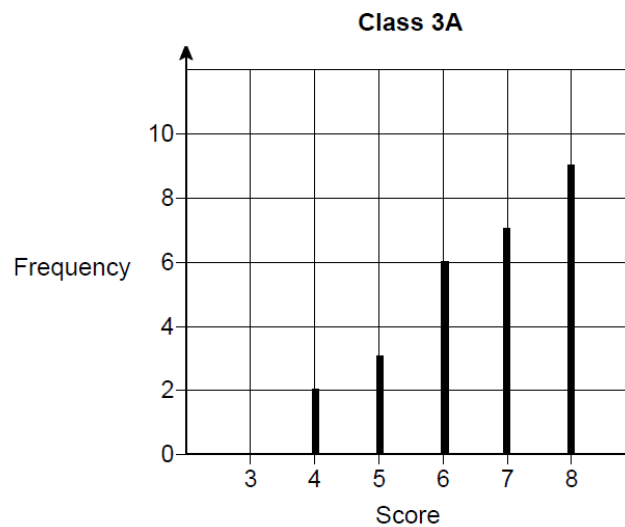
Her results are shown in this bar chart.

Find the median number of holidays.

............................... [2]

3. The diagram shows information about the scores of Class 3A in a spelling test.
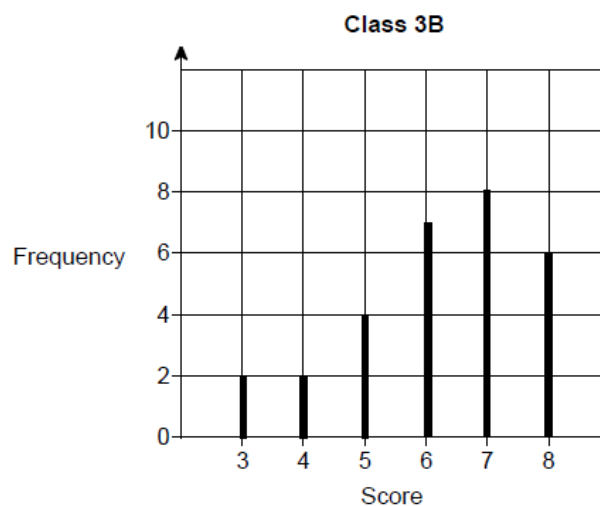
**Class 3A**



(a) A student is chosen at random from Class 3A.

Work out the probability that the student's score was the mode for the class.

[3]

The diagram shows information about the scores of Class 3B in the same test.

**Class 3B**



(b) Show that Class 3A had more consistent scores than Class 3B.

Use the data from both diagrams.

[2]

(c) Lucy is one of the 29 students in Class 3B.

Her score was the same as the median score for her class.

Work out her score.

[2]

4. Here is a list of numbers

12    19    12    15    11    15    12    13    17

Find the median.

..................................................... [2]

5. The table shows some information about the foot lengths of 40 adults.

| Foot length ($f$ cm) | Number of adults |
|---|---|
| $16 \leqslant f < 18$ | 3 |
| $18 \leqslant f < 20$ | 6 |
| $20 \leqslant f < 22$ | 10 |
| $22 \leqslant f < 24$ | 12 |
| $24 \leqslant f < 26$ | 9 |

(a) Write down the modal class interval.

..................................................... [1]

(b) Calculate an estimate for the mean foot length.

..................................................... cm [3]

6. The table shows information about the ages of all the people at a party.

| Age (years) | Frequency |
|---|---|
| $11 - 20$ | 6 |
| $21 - 30$ | 16 |
| $31 - 40$ | 10 |
| $41 - 50$ | 8 |

(a) Work out the total number of these people who were aged 40 or less.

..................................................... [1]

Andy says that the range of ages is 39 years because 50 − 11 = 39

(b) The range may not be 39 years.

   Explain why.

...................................................................................................................

...............................................................................................................[1]

7.  Rachel carried out a survey of 10 people to find out the type of fruit they like best.

   The table gives information about her results.

| Type of fruit | Number of people |
|---|---|
| apple | 2 |
| banana | 5 |
| orange | 3 |

   Which type of fruit is the mode?

..................................................... [1]

8.  The stem and leaf diagram gives information about the speeds of 27 cars.

```
3 | 8
4 | 1 3 4 6 7 8 8 9 9
5 | 2 2 4 6 7 7 8 8 9
6 | 1 1 2 2 2 2 3
7 | 0
```

Key:
3 | 8 means 38 miles per hour

(a) Find the median speed.

..................................................... miles per hour [1]

 (b) Work out the range.

..................................................... miles per hour [1]

One of the cars is chosen at random.

Jack says,

  "*The probability that the speed of this car is more than 60 miles per hour is $\frac{1}{3}$*"

(c) Jack is wrong.

Explain why.

[2]

9. Ross rolled an ordinary dice 30 times.

The frequency table gives information about his results.

| Score | Frequency |
|-------|-----------|
| 1 | 7 |
| 2 | 5 |
| 3 | 4 |
| 4 | 4 |
| 5 | 6 |
| 6 | 4 |

Ross worked out the mean score as 8

(a) Explain why it is impossible for the mean score to be 8

[1]

Graham also worked out the mean score.

Here is his working.

$$1 \times 7 + 2 \times 5 + 3 \times 4 + 4 \times 4 + 5 \times 6 + 6 \times 4 = 99$$

$$99 \div 6 = 16.5$$

The mean score is 16.5

(b) Describe the mistake Graham made in his method to work out the mean score.

[1]

10. Here are seven numbers.

| 13 | 6 | 12 | 7 | 6 | 4 | 8 |

(a) Work out the range of the seven numbers.

Circle your answer.

[1]

5    6    7    8    9

(b) What is the mode of the seven numbers?

Circle your answer.

[1]

5    6    7    8    9

11. The table shows information about the marks of 30 students in a test.

| Mark | Frequency |
|---|---|
| 14 | 2 |
| 15 | 10 |
| 16 | 2 |
| 17 | 3 |
| 18 | 13 |
| | Total = 30 |

Students who scored less than the mean mark have to retake the test.

How many students have to retake the test?

You must show your working.

[3]

12. The times that 80 customers waited at a supermarket checkout are shown.

| Time, $t$ (minutes) | Frequency |
|---|---|
| $0 \leqslant t < 2$ | 32 |
| $2 \leqslant t < 4$ | 19 |
| $4 \leqslant t < 6$ | 20 |
| $6 \leqslant t < 8$ | 7 |
| $8 \leqslant t < 10$ | 2 |

(a) In which class interval is the median?

Circle your answer.

[1]

$0 \leqslant t < 2$      $2 \leqslant t < 4$      $4 \leqslant t < 6$      $6 \leqslant t < 8$

(b) The manager of the supermarket says,

*"90% of our customers wait less than 6 minutes."*

Does the data support this statement?

You must show your working.

[2]

13. Adam and six other men ran a race.

The times, in seconds, of the six other men are shown.

9.75      9.79      9.80      9.88      9.94      9.98

The mean time for **all seven** men was 9.83 seconds.

Did Adam win the race?

You must show your working.

[3]

14. Susan recorded the temperature outside her house five times on one day.

She recorded the first temperature at 7:00 a.m. and repeated the process every three hours.

The temperatures she recorded are shown in the table below.

(a) Complete the table to show the times at which she recorded the other three temperatures.

| Time | 7:00 a.m. | | | | 7:00 p.m. |
|---|---|---|---|---|---|
| Temperature | 14°C | 18°C | 23°C | 19°C | 16°C |

[2]

(b) What was the range of the temperatures that Susan recorded?

[1]

(c) What was the mean of the temperatures that Susan recorded?

[2]

(d) Explain why the answers you have found may not be the correct mean and range of the temperature for the whole time between 7:00 a.m. and 7:00 p.m.

[1]

15. Angela plays netball for her local team.

The number of goals she has scored in her first seven games is 3, 4, 5, 5, 6, 8 and 9.

(a) Explain why the mode is 5.

[1]

(b) Angela's coach thinks that it is possible for Angela to achieve a median of 6 and a range of 7 after two more games are completed.

Give a possible number of goals scored in each of the next two games that would allow Angela to achieve this.

[2]

16. (a) When visiting a hat shop, each customer had the circumference of their head measured.

The table shows the results for the customers who bought a hat during December.

| Head circumference, $c$ (cm) | Number of customers |
|---|---|
| $50 \leq c < 54$ | 12 |
| $54 \leq c < 58$ | 32 |
| $58 \leq c < 62$ | 14 |
| $62 \leq c < 66$ | 2 |

Calculate an estimate for the mean head circumference.

[4]

(b) The hat shop sells 4 different sizes of hats.

The conversion table from head circumference to hat size is shown below

| Head circumference, $c$ (cm) | Hat size |
|---|---|
| $50 \leq c < 54$ | 1 |
| $54 \leq c < 58$ | 2 |
| $58 \leq c < 62$ | 3 |
| $62 \leq c < 66$ | 4 |

A salesman places an order for new stock for the hat shop.

The salesman's order form shows that about half of the hats ordered are size 2.

The owner of the shop says the order should show that about a quarter of the hats ordered are size 2.

Who is more likely to be correct, the salesman or the owner of the shop?

You must give a reason for your answer.

[2]

17. The manager of a clothes shop recorded the size of each dress sold one morning.

10    10

12    12

14    14    14    14    14    14

16    16    16    16

18    18    18

20    20    20

The sizes of dresses are always even numbers.

The mean size of the dresses sold that morning is 15.3

The manager says: *"The mean size of the dresses is not a very useful average."*

(i) Explain why the manager is right.

(ii) Which is the more useful average for the manager to know, the median or the mode?
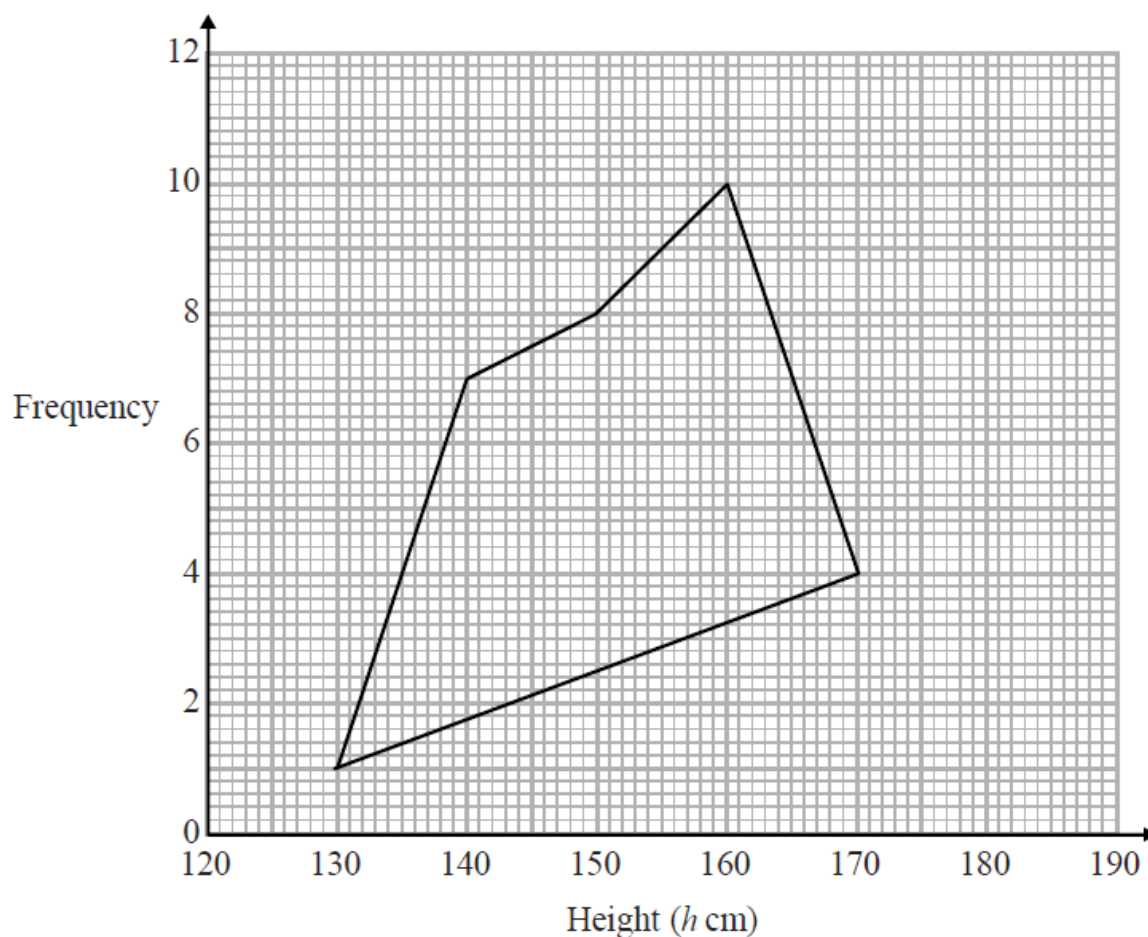
You must give a reason for your answer.

[2]

18. The grouped frequency table gives information about the heights of 30 students.

| Height ($h$ cm) | Frequency |
|---|---|
| $130 < h \leqslant 140$ | 1 |
| $140 < h \leqslant 150$ | 7 |
| $150 < h \leqslant 160$ | 8 |
| $160 < h \leqslant 170$ | 10 |
| $170 < h \leqslant 180$ | 4 |

(a) Write down the modal class interval.

.................................................................................................... [1]

This incorrect frequency polygon has been drawn for the information in the table.

(b) Write down two things wrong with this incorrect frequency polygon.

1

2

[2]

19. Jenny works in a shop that sells belts.

The table shows information about the waist sizes of 50 customers who bought belts from the shop in May.

| Belt size | Waist ($w$ inches) | Frequency |
|---|---|---|
| Small | $28 < w \leqslant 32$ | 24 |
| Medium | $32 < w \leqslant 36$ | 12 |
| Large | $36 < w \leqslant 40$ | 8 |
| Extra Large | $40 < w \leqslant 44$ | 6 |

(a) Calculate an estimate for the mean waist size.

...................................................inches [3]

Belts are made in sizes Small, Medium, Large and Extra Large.

Jenny needs to order more belts in June.
The modal size of belts sold is Small.

Jenny is going to order $\frac{3}{4}$ of the belts in size Small.

The manager of the shop tells Jenny she should not order so many Small belts.

(b) Who is correct, Jenny or the manager?

You must give a reason for your answer.

[2]

# CREDITS AND NOTES

| Question | Awarding Body | Question | Awarding Body |
|----------|---------------|----------|---------------|
| 1 | OCR | 12 | AQA |
| 2 | OCR | 13 | AQA |
| 3 | AQA | 14 | WJEC Eduqas |
| 4 | Pearson Edexcel | 15 | WJEC Eduqas |
| 5 | Pearson Edexcel | 16 | WJEC Eduqas |
| 6 | Pearson Edexcel | 17 | Pearson Edexcel |
| 7 | Pearson Edexcel | 18 | Pearson Edexcel |
| 8 | Pearson Edexcel | 19 | Pearson Edexcel |
| 9 | Pearson Edexcel |  |  |
| 10 | AQA |  |  |
| 11 | AQA |  |  |

## Notes:

These questions have been retyped from the original sample/specimen assessment materials and whilst every effort has been made to ensure there are no errors, any that do appear are mine and not the exam board s (similarly any errors I have corrected from the originals are also my corrections and not theirs!).

Please also note that the layout in terms of fonts, answer lines and space given to each question does not reflect the actual papers to save space.

These questions have been collated by me as the basis for a GCSE working party set up by the GLOW maths hub - if you want to get involved please get in touch. The objective is to provide support to fellow teachers and to give you a flavour of how different topics "could" be examined. They should not be used to form a decision as to which board to use. There is no guarantee that a topic will or won't appear in the "live" papers from a specific exam board or that examination of a topic will be as shown in these questions.

## Links:

AQA http://www.aqa.org.uk/subjects/mathematics/gcse/mathematics-8300

OCR http://ocr.org.uk/gcsemaths

Pearson Edexcel http://qualifications.pearson.com/en/qualifications/edexcel-gcses/mathematics-2015.html

WJEC Eduqas http://www.eduqas.co.uk/qualifications/mathematics/gcse/

## Contents:

This version contains questions from:

AQA – Sample Assessment Material and Practice set 1

OCR – Sample Assessment Material and Practice set 1

Pearson Edexcel – Sample Assessment Material, Specimen set 1 and Specimen set 2.

WJEC Eduqas – Sample Assessment Material