Higher tier unit 3a check in test

Calculator

Q1. Some men and women each did one activity at a sports centre.
The two-way table shows what activities they chose. Some of the numbers are missing.

	Swimming	**Squash**	**Gym**	**Total**
Women	15	2		
Men	9	6	14	
Total	24		18	

How many people used the sports centre in total?

[Q2–3 linked]

Q2. Here is a list of 12 numbers.

12 15 18 12 15 12 16 13 17 15 12 17

Work out the range.

Q3. Work out the mean of the 12 numbers in question 2.

[Q4–5 linked]

Q4. The stem-and-leaf diagram gives information about the numbers of tomatoes on 31 tomato plants.

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

Key 5|7 = 57 tomatoes

Work out the mode.

Q5. Work out the median for the data in the stem-and-leaf diagram in question 4.

Q6. The back-to-back stem-and-leaf diagram shows the times of runners from two clubs for a 10-kilometre race.

Key:

5 | 3 represents 35 minutes for the Harriers

3 | 9 represents 39 minutes for the Swifts

Harriers		Swifts
8 7 5	3	9
4 3 3 2 2 1 0	4	0 1 1 2 5 6 6 8
8 7 6 2 1 0	5	1 3 4 4 6 7 8
3 1 1	6	

Use the median and range to compare the times of the runners from the two clubs.
Which of these statements best describes the data?

[Q7–8 linked]

Q7. Vicky counts the number of birds in her garden at 5 pm on each of 20 days.
She records the information in a frequency table.

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

Work out the mean.

Q8. Work out the median for the data in the frequency table in question 8.

[Q9–10 linked]

Q9. The table gives information about the temperature, T °C, at noon in a town for 50 days.

Temperature (T °C)	Frequency
$8 < T \leqslant 12$	6
$12 < T \leqslant 16$	8
$16 < T \leqslant 20$	13
$20 < T \leqslant 24$	21
$24 < T \leqslant 28$	2

Find the modal class interval.

Q10. Calculate an estimate for the mean temperature for the data in the table in question 9.

Topics listed in objectives

- Design and use two-way tables for discrete and grouped data;
- Use information provided to complete a two-way table;
- Sort, classify and tabulate data and discrete or continuous quantitative data;
- Calculate mean and range, find median and mode from a small data set;
- Use a spreadsheet to calculate mean and range, and find median and mode;
- Recognise the advantages and disadvantages between measures of average;
- Construct and interpret stem and leaf diagrams (including back-to-back diagrams):
  - find the mode, median, range, as well as the greatest and least values from stem and leaf diagrams, and compare two distributions from stem and leaf diagrams (mode, median, range);
- Calculate the mean, mode, median and range from a frequency table (discrete data);
- Construct and interpret grouped frequency tables for continuous data:
  - for grouped data, find the interval which contains the median and the modal class;
  - estimate the mean with grouped data;
  - understand that the expression 'estimate' will be used where appropriate, when finding the mean of grouped data using mid-interval values.

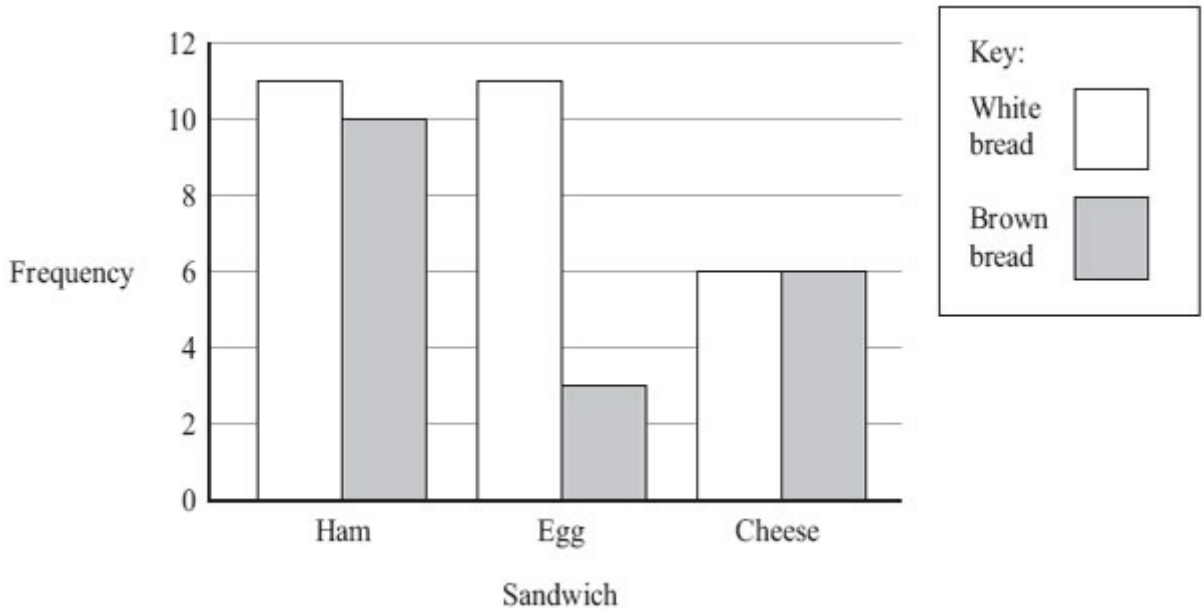
Answers

Q1. 50
Q2. 6
Q3. 14.5
Q4. 28
Q5. 32
Q6. The Harriers were faster but less consistent than the Swifts
Q7. 2.75
Q8. 3
Q9. $20 < T \leq 24$
Q10. 18.4

Higher tier unit 3b check in test

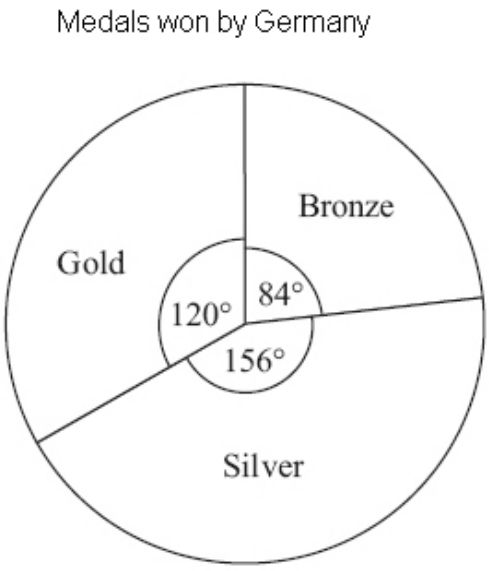
Calculator

Q1. Ann works in a sandwich shop.
The dual bar chart shows information about the sandwiches sold.



More white bread sandwiches were sold than brown bread sandwiches.
Work out how many more white bread sandwiches.

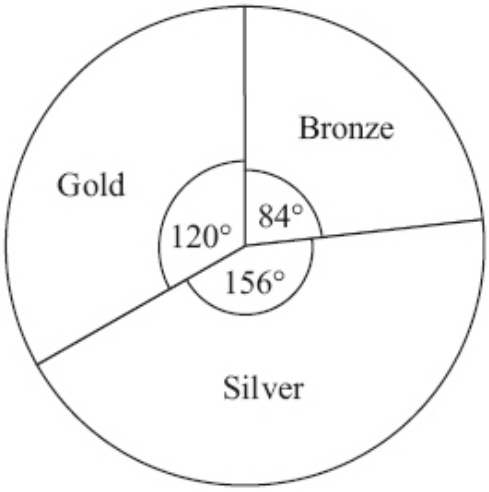
Q2. The pie chart shows some information about the numbers of medals won by Germany in the 2010 Winter Olympics.



Germany won 7 bronze medals.
How many gold medals did Germany win?

Q3. The pie charts show some information about the numbers of medals won by Germany and by the Russian Federation in the 2010 Winter Olympics.

Medals won by Germany



Medals won by the Russian Federation

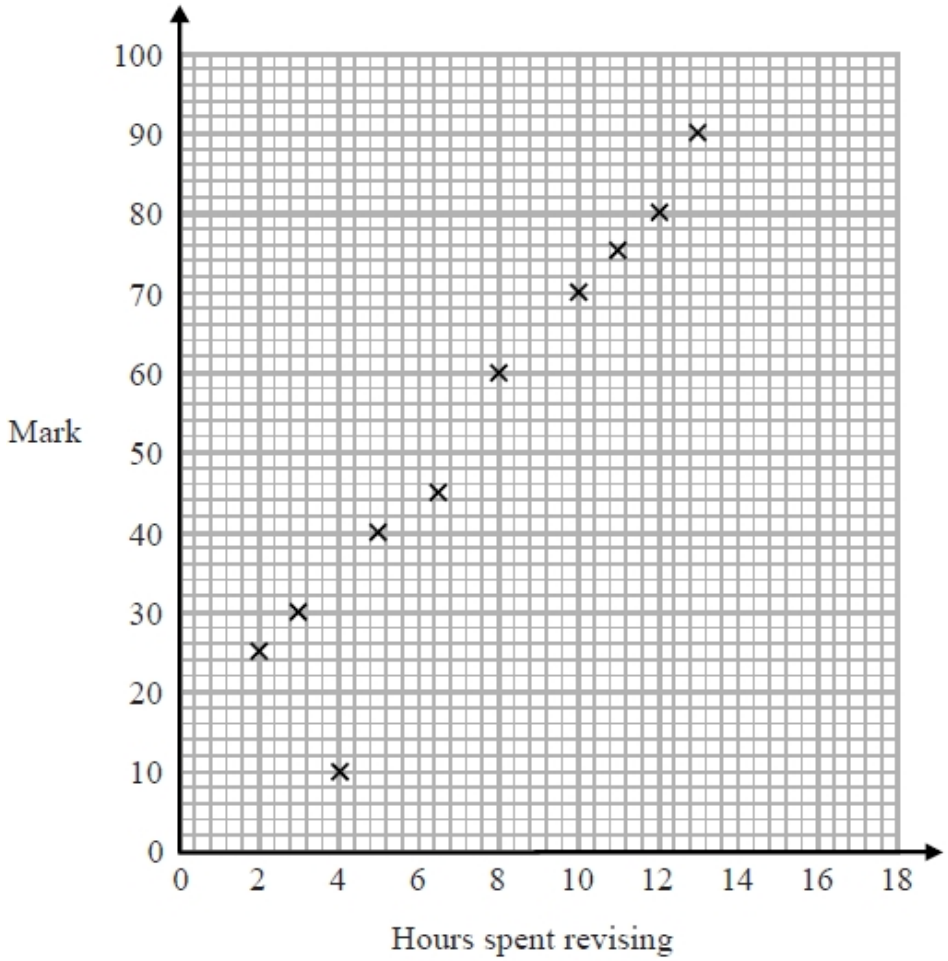
Graham says,

'The pie charts show that Germany won more gold medals than the Russian Federation.'

Is Graham right? You must give a reason.

[Q4–5 linked]

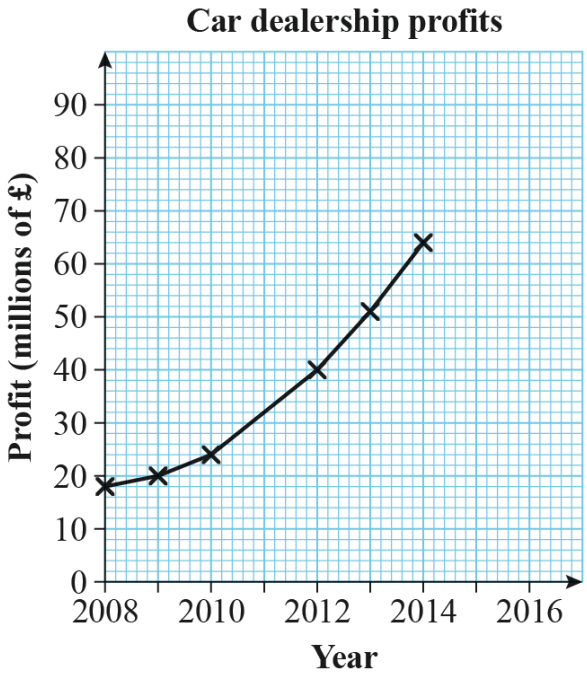
Q4. The scatter diagram shows information about 10 students.
For each student, it shows the number of hours spent revising and the mark the student achieved in the Spanish test.



Describe the correlation.

Q5. A different student studies for 9 hours.
Using the scatter diagram in question 4, estimate the mark gained by this student.

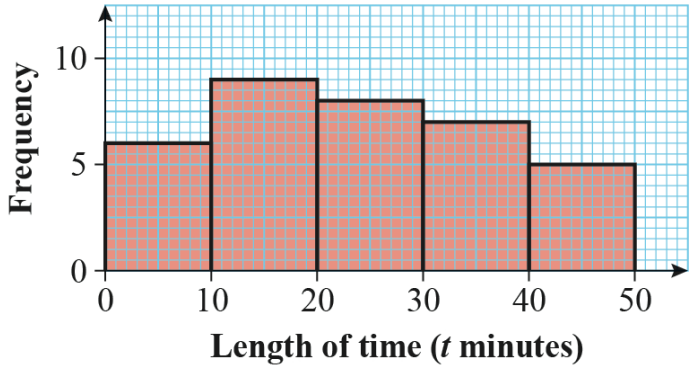
Q6. The time series graph shows the profit of a car dealership over the past 7 years.



Describe the overall trend.

[Q7–8 linked]

Q7. Helen went on some flights in a hot air balloon last year.
The histogram shows some information about the length of time, t minutes, of each flight.

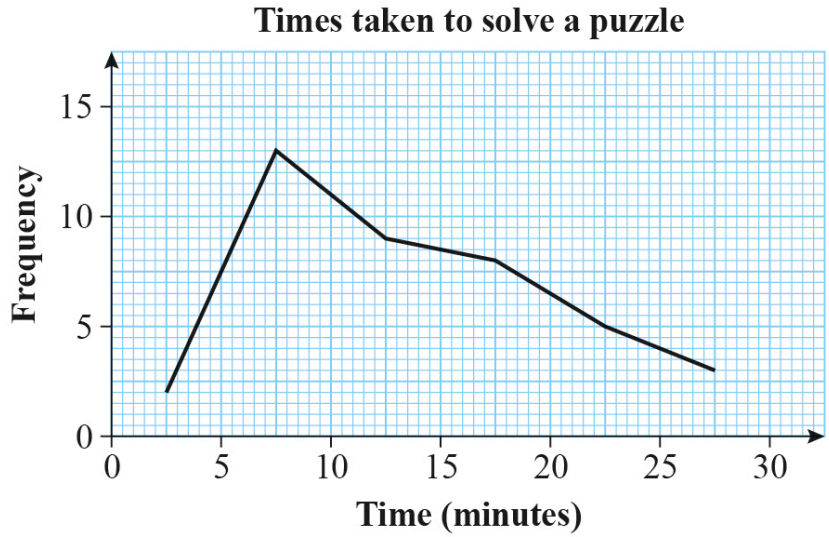


How many flights did Helen go on in total?

Q8. Estimate the median flight length for the data in the histogram in question 7.

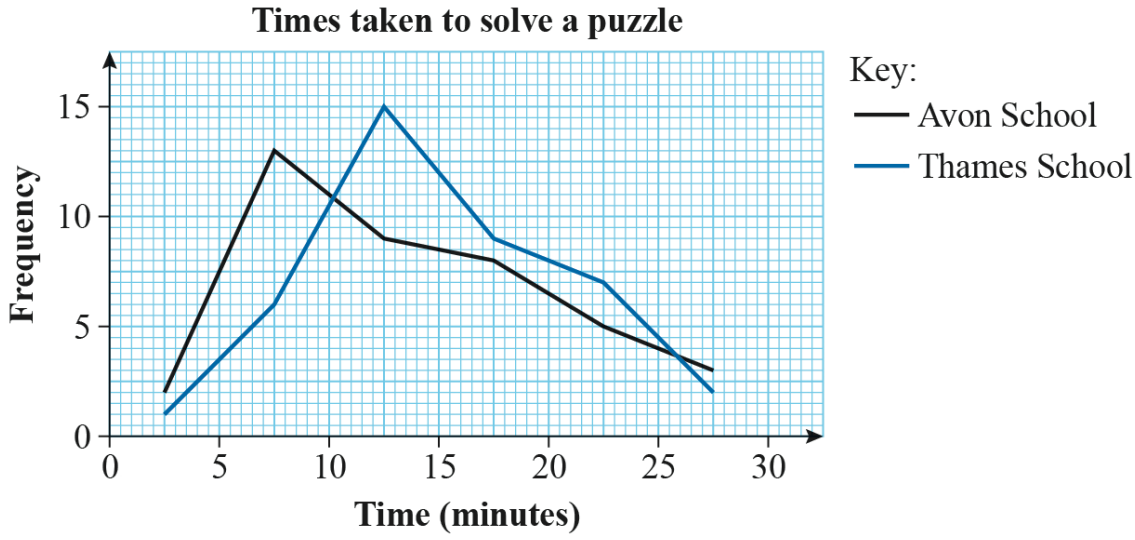
[Q9–10 linked]

Q9. Avon School entered 40 students into a maths challenge.
The students had to solve a puzzle and they were timed to see how long each student took.
This is the frequency polygon showing the distribution of times taken by the Avon students.



Use the frequency polygon to find an estimate for the students' mean time.

Q10. Avon School and Thames School each entered 40 students into a maths challenge.
The students had to solve a puzzle and they were timed to see how long each student took.
These are the frequency polygons showing the distribution of times taken by the students from both schools.



Compare the two frequency polygons.

Topics listed in objectives

- Know which charts to use for different types of data sets;
- Produce and interpret composite bar charts;
- Produce and interpret comparative and dual bar charts;
- Produce and interpret pie charts:
  - find the mode and the frequency represented by each sector;
  - compare data from pie charts that represent different-sized samples;
- Produce and interpret frequency polygons for grouped data:
  - from frequency polygons, read off frequency values, compare distributions, calculate total population, mean, estimate greatest and least possible values (and range);
- Produce frequency diagrams for grouped discrete data:
  - read off frequency values, calculate total population, find greatest and least values;
- Produce histograms with equal class intervals:
  - estimate the median from a histogram with equal class width or any other information, such as the number of people in a given interval;
- Produce line graphs:
  - read off frequency values, calculate total population, find greatest and least values;
- Construct and interpret time–series graphs, comment on trends;
- Compare the mean and range of two distributions, or median or mode as appropriate;
- Recognise simple patterns, characteristics relationships in bar charts, line graphs and frequency polygons;
- Draw and interpret scatter graphs in terms of the relationship between two variables;
- Draw lines of best fit by eye, understanding what these represent;
- Identify outliers and ignore them on scatter graphs;
- Use a line of best fit, or otherwise, to predict values of a variable given values of the other variable;
- Distinguish between positive, negative and zero correlation using lines of best fit, and interpret correlation in terms of the problem;
- Understand that correlation does not imply causality, and appreciate that correlation is a measure of the strength of the association between two variables and that zero correlation does not necessarily imply ‘no relationship’ but merely ‘no linear correlation’;
- Explain an isolated point on a scatter graph;
- Use the line of best fit make predictions; interpolate and extrapolate apparent trends whilst knowing the dangers of so doing.

Answers

Q1. 9
Q2. 10
Q3. No, Germany won a higher proportion of gold medals than the Russian Federation, but not necessarily more medals.
Q4. positive correlation
Q5. 65 marks
Q6. The increases in profit from year to year get larger each year.
Q7. 35
Q8. 23 minutes 45 seconds
Q9. 13.75
Q10. Both schools have the same median but Avon have more students than Thames in the lower time groups, so the Avon students performed better.