Worksheet - Data: averages and charts

Year: Year 7 · 20

Show your working.

Question 1

Question 1 – Mean, median, mode and range *(Section A · Skills practice)*

Find the mean, median, mode and range of each set of data.

a. 4, 7, 3, 8, 7, 5, 9, 7, 2
b. 6, 9, 4, 11, 6, 8
c. 1.2, 0.8, 1.5, 0.8, 2.1

Question 2

Question 2 – Finding a missing value *(Section A · Skills practice)*

Use averages to find the missing numbers.

a. The mean of 5, 8, 12, 3 and x is 7. Find x.
b. The mean of six numbers is 9. Five of them are 4, 12, 7, 10 and 11. Find the sixth.
c. The median of 3, 5, 8, x, 15 is 8 and x is a whole number greater than 8. What values can x take?
d. The range of 4, 9, y, 15 is 13. Find the possible values of y.

Question 3

Question 3 – Frequency tables *(Section A · Skills practice)*

The table shows the number of goals scored by a school team in 20 matches.

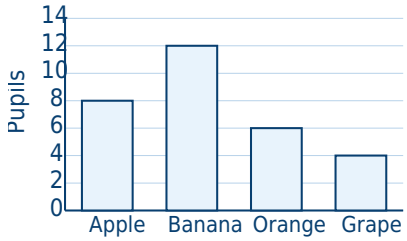
Goals	0	1	2	3	4
Frequency	3	6	5	4	2

a. Find the mode.
b. Find the median.
c. Work out the total number of goals and the mean.
d. What is the range?

Question 4

Question 4 – Reading charts *(Section A · Skills practice)*

The bar chart shows the favourite fruit of 30 pupils.



a. How many pupils chose bananas?
b. Which fruit is the mode?
c. What fraction of the pupils chose oranges? Simplify.
d. What percentage chose grapes? Give your answer to 1 decimal place.

Question 5

Question 5 – Pie charts *(Section A · Skills practice)*

The table shows how 36 pupils travel to school.

Method	Walk	Bus	Car	Cycle
Pupils	15	9	8	4

a. Work out the angle for each method on a pie chart.
b. Check that your angles add up to 360°.
c. Which method has an angle of 90°?

Question 6

Question 6 – Averages from grouped data *(Section A · Skills practice)*

The table shows the time taken by 20 pupils to run 100 m.

Time t (seconds)	Frequency
$12 \leq t < 14$	3
$14 \leq t < 16$	8
$16 \leq t < 18$	6
$18 \leq t < 20$	3

a. Write down the modal class.
b. In which class is the median?
c. Estimate the mean using the midpoints 13, 15, 17, 19.
d. Explain why this mean is only an estimate.

Question 7

Question 7 – School test scores *(Section B · Real-life practice)*

Class 7A and Class 7B took the same science test, marked out of 20.

Class	Marks
7A	12, 15, 9, 18, 15, 11, 14, 15, 7
7B	13, 14, 12, 15, 14, 13, 16, 14, 15

a. Work out the mean, median, mode and range for each class.
b. Which class did better on average? Explain.
c. Which class was more consistent? Use the range.
d. A new pupil joins 7A and scores 20. Work out the new mean.

Question 8

Question 8 – Shoe sizes *(Section B · Real-life practice)*

A shoe shop records the shoe sizes sold in one morning: 5, 6, 7, 6, 8, 6, 9, 7, 6, 10, 7, 6.

a. Draw up a frequency table.
b. Which size is the mode and why is the mode most useful to the shop owner?
c. Find the median size.
d. Find the mean shoe size to 1 decimal place. Explain why the mean is not very useful here.

Question 9

Question 9 – Daily temperature *(Section B · Real-life practice)*

The table shows the midday temperature in a UK city over a week in April.

Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Temp (°C)	11	13	9	12	14	8	12

a. Find the mean temperature to 1 decimal place.
b. Find the median and the range.
c. On which days was the temperature above the mean?
d. The temperature on Monday of the next week is 10 °C. What is the new mean temperature for the 8 days?

Question 10

Question 10 – Pocket money survey *(Section B · Real-life practice)*

A pupil asks 10 friends how much pocket money they get each week. The results (in pounds) are: 5, 8, 10, 5, 12, 6, 5, 40, 7, 5.

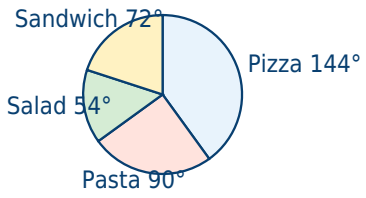
a. Find the mean, median and mode.
b. One value is an outlier. Which one?

c. Remove the outlier and recalculate the mean.
d. Which average best represents the typical amount? Explain.

Question 11

Question 11 – The school canteen *(Section B · Real-life practice)*

The pie chart shows what 40 Year 7 pupils chose for lunch one Monday.



a. How many pupils chose each option?
b. What fraction chose pasta?
c. Which option was the mode?
d. The next day the canteen manager says 15 more pupils would have chosen pizza than salad. Is that true on Monday?

Question 12

Question 12 – Cycling results *(Section B · Real-life practice)*

Zara records how many kilometres she cycled each day for two weeks.

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Week 1	5	8	0	12	7	15	9
Week 2	6	9	7	10	8	11	8

a. Find the mean distance for each week.
b. Find the median and range for each week.
c. In which week was her cycling more consistent?
d. Zara wants a mean of at least 9 km per day over the whole fortnight. Did she achieve this?

Question 13

Question 13 – Comparing two football teams *(Section B · Real-life practice)*

The number of goals scored by two teams in their last 8 matches are recorded.

Team	Goals
Rovers	0, 4, 1, 3, 2, 5, 0, 1
United	2, 2, 1, 3, 2, 2, 3, 1

a. Find the mean, median and range for each team.
b. Which team scores more goals on average?
c. Which team is more consistent?
d. The manager of Rovers says "We are the better team because we scored the most goals in one match". Comment.

Question 14

Question 14 – Designing a questionnaire *(Section C · Problem solving)*

A school council wants to find out how many hours of sleep Year 7 pupils get. Two pupils suggest different ways to collect data. Amy asks 20 friends in her class. Ben asks every 10th pupil on the school register of 150 pupils.

a. Which method is less likely to be biased and why?
b. How many pupils does Ben ask?
c. Write a good question with response boxes to find out hours of sleep.
d. Ben's 15 pupils slept for 7, 8, 9, 8, 7, 10, 8, 9, 6, 8, 9, 7, 8, 10 and 9 hours. Find the mode, the median and the mean.

Question 15

Question 15 – Library loans *(Section B · Real-life practice)*

The school librarian records the number of books borrowed each day for 10 days: 14, 9, 21, 14, 17, 9, 14, 30, 12, 15.

a. Find the mode, median and mean.
b. Which day has an unusually high number of loans? Suggest a reason.
c. Find the mean without that day.
d. The librarian wants to order books for the next 20 school days. Which average should she use to estimate the total number of loans? Work it out.

Question 16

Question 16 – Averages and algebra *(Section C · Problem solving)*

Five whole numbers have mean 8, median 7 and range 9. The smallest number is 3 and the mode is 7.

a. Find the total of the five numbers.
b. Find the largest number.
c. Find the five numbers.
d. Check that your set has the right mean, median, mode and range.

Question 17

Question 17 – Choosing the best average *(Section C · Problem solving)*

A small company has 7 employees. Their yearly salaries (in thousands of pounds) are 18, 20, 20, 22, 24, 26 and 140 (the owner).

a. Find the mean, median and mode.
b. The owner says "The average salary is over £38 000." Which average is she using?
c. A new worker wants to know what a typical employee earns. Which average would you tell her and why?
d. The company hires an eighth worker on £22 000. Find the new median and mean.

Question 18

Question 18 – Spot the mistake *(Section C · Problem solving)*

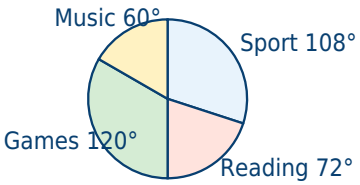
Each pupil made one mistake. Find it and correct it.

a. Ali: the median of 3, 9, 5, 7 is (9 + 5) ÷ 2 = 7 because 9 and 5 are in the middle of the list.
b. Beth: the mean of 10, 12, 14 is 36.
c. Carl: the range of 4, 9, 15 is 4 + 9 + 15 = 28.
d. Dina: the mode of 2, 3, 3, 4, 4, 5 is 3 only.

Question 19

Question 19 – Interpreting a pie chart *(Section C · Problem solving)*

A pie chart shows how Year 7 pupils spend a free hour on a Friday. There are 120 pupils.



a. Work out the number of pupils for each activity.
b. What percentage chose sport?
c. The head teacher says "half of the pupils chose sport or music". Is she right?
d. Next term 20% more pupils choose music. How many pupils is that?

Question 20

Question 20 – Challenge: mean of means *(Section D · Challenge)*

Class A has 10 pupils with a mean test score of 14. Class B has 20 pupils with a mean test score of 17.

a. Find the total score for each class.

b. Find the mean score for the two classes combined.
c. Explain why the combined mean is not (14 + 17) ÷ 2.
d. A new pupil joins Class A and the mean of Class A becomes 14.5. What mark did the new pupil score?