

WJEC GCSE MATHS • GRADE 2

MATHS



MODEL ANSWERS

STATISTICAL PROBLEM SOLVING CYCLE

SCORE

/185

PERCENTAGE

%

STEM UP

- 1 Ioan is carrying out a statistical investigation.
He writes the questions for a questionnaire.
Which stage of the statistical problem-solving cycle is this?
The four stages are: specify the problem and plan, collect the data, process and represent the data, interpret and discuss the results.

He writes the questions for a questionnaire, so this is the stage: specify the problem and plan

Specify the problem and plan

/ 1

- 2 The statistical problem-solving cycle has four stages.
The four stages are: specify the problem and plan, collect the data, process and represent the data, interpret and discuss the results.
Which stage comes before the stage "interpret and discuss the results"?

*Order: 1 specify the problem and plan
2 collect the data
3 process and represent the data
4 interpret and discuss the results*

Process and represent the data

/ 1

- 3 Here are the numbers of goals scored by a team in 8 matches.
7, 5, 3, 18, 6, 12, 19, 5
Write down the mode.

5 appears most often (2 times)

5

/ 1

- 4 Sam is carrying out a statistical investigation.
He copies figures on rainfall from a weather website.
Which stage of the statistical problem-solving cycle is this?
The four stages are: specify the problem and plan, collect the data, process and represent the data, interpret and discuss the results.

He copies figures on rainfall from a weather website, so this is the stage: collect the data

Collect the data

/ 1

- 5 The statistical problem-solving cycle has four stages.
The four stages are: specify the problem and plan, collect the data, process and represent the data, interpret and discuss the results.
Which stage comes before the stage "process and represent the data"?

*Order: 1 specify the problem and plan
2 collect the data
3 process and represent the data
4 interpret and discuss the results*

Collect the data

/ 1

- 6 Here are the numbers of books read by 9 pupils in one term.
11, 18, 8, 8, 17, 15, 14, 3, 5
Write down the mode.

8 appears most often (2 times)

8

/ 1

- 7 Iolo collects data and puts it in a tally chart.
Complete the frequency column in the tally chart.

Tally chart

Favourite sport	Tally	Frequency
Football		13
Rugby		6
Netball		6
Swimming		13

Count the tally marks: each group of five has a line across it

Football 13, Rugby 6

1 / 1

- 8 The statistical problem-solving cycle has four stages.
The four stages are: specify the problem and plan, collect the data, process and represent the data, interpret and discuss the results.
Which stage comes after the stage "collect the data"?

Order: 1 specify the problem and plan
2 collect the data
3 process and represent the data
4 interpret and discuss the results

Process and represent the data

1 / 1

- 9 Write down whether each source of data is primary or secondary.
(a) Nia uses weather records collected by the Met Office.
(b) Owen times how long each pupil takes to run a lap.
(c) Mari reads the number of visitors to a museum in a published report.

Primary data is collected by the person doing the investigation
secondary data was collected by someone else

(a) secondary (b) primary (c) secondary

1 / 1

- 10 The tally chart shows the answers given by some people.
How many people answered the question?

Favourite colour	Tally
Red	
Blue	
Green	
Yellow	

$$4+4+12+9 = 29$$

29

1 / 1

- 11 Here are the marks of 7 pupils in a quiz.
17, 19, 15, 15, 16, 16, 13
Work out the range.

$$\text{Range} = \text{largest} - \text{smallest} = 19 - 13 = 6$$

6

1 / 1

- 12 Write down whether each source of data is primary or secondary.
(a) Ceri uses figures on house prices from a government website.
(b) Owen times how long each pupil takes to run a lap.
(c) Nia uses weather records collected by the Met Office.

Primary data is collected by the person doing the investigation
secondary data was collected by someone else

(a) secondary (b) primary (c)
secondary

1 / 1

- 13 Aled collects data and puts it in a tally chart.
Complete the tally column in the tally chart.

Tally chart

Colour of cars passing the school	Tally	Frequency
Black		12
White		2
Silver		2
Red		3

Draw the right number of tally marks, with a line across each group of five

Black: 12 tally marks, Red: 3 tally marks

/ 1

- 14 Here are the numbers of text messages sent by 6 pupils in one day.
5, 8, 17, 17, 15, 16
Work out the mean.

$$(5 + 8 + 17 + 17 + 15 + 16) \div 6 = 78 \div 6 = 13$$

13

/ 1

- 15 Write down whether each source of data is primary or secondary.
(a) Gwen asks her classmates which sport they like best.
(b) Sian uses data about population from a census.
(c) Elin rolls a dice 50 times and records the scores.

*Primary data is collected by the person doing the investigation
secondary data was collected by someone else*

(a) primary (b) secondary (c) primary

/ 1

- 16 Rhian is going to investigate how many text messages people send.

Write down a hypothesis that she could test.

A hypothesis is a statement that can be tested with data

Example: Younger people send more text messages than older people

Younger people send more text messages than older people.

/ 1

- 17 Write down whether each set of data is qualitative, discrete or continuous.

(a) the shoe size of each pupil

(b) the mass of each parcel

(c) the number of brothers and sisters of each pupil

Words or categories are qualitative

counted numbers are discrete

measured values are continuous

(a) discrete (b) continuous (c) discrete

/ 1

- 18 Here are the numbers of customers in a shop at 5 different times.

18, 11, 7, 11, 18

Work out the mean.

$$(18 + 11 + 7 + 11 + 18) \div 5 = 65 \div 5 = 13$$

13

/ 1

- 19 Mari is going to investigate the link between hours of sleep and test scores.
Write down a hypothesis that she could test.

A hypothesis is a statement that can be tested with data

Example: Pupils who sleep for longer get higher test scores

Pupils who sleep for longer get higher test scores.

/ 1

- 20 Write down whether each set of data is qualitative, discrete or continuous.
- (a) the mass of each parcel
 - (b) the shoe size of each pupil
 - (c) the type of pet each pupil has

*Words or categories are qualitative
counted numbers are discrete
measured values are continuous*

(a) continuous (b) discrete (c) qualitative

/ 1

- 21 The tally chart shows the answers given by some people.
How many more people chose Pasta than Sandwich?

Favourite lunch	Tally
Pizza	
Pasta	
Salad	
Sandwich	

$$6 - 4 = 2$$

2

/ 1

- 22 Evan is going to investigate how pupils travel to school.
Write down a hypothesis that he could test.

A hypothesis is a statement that can be tested with data

Example: More than half of the pupils in the school walk to school

More than half of the pupils in the school walk to school.

/ 1

- 23 Write down whether each set of data is qualitative, discrete or continuous.
- (a) the type of pet each pupil has
 - (b) the mass of each parcel
 - (c) the number of brothers and sisters of each pupil

Words or categories are qualitative

counted numbers are discrete

measured values are continuous

*(a) qualitative (b) continuous
(c) discrete*

/ 1

- 24 Give one advantage of using primary data.

You know how the data was collected and it is exactly what you need

/ 1

- 25 Sam is going to investigate whether boys or girls can run 100 metres faster.
Write down a hypothesis that he could test.

A hypothesis is a statement that can be tested with data

Example: Boys run 100 metres faster than girls, on average

Boys run 100 metres faster than girls, on average.

/ 1

- 26 Here are three statements.
A: How much does an electric car cost?
B: Electric cars cost more to buy than petrol cars.
C: Electric cars are the future.
Which one could be a hypothesis for a statistical investigation?
Give a reason for your answer.

B, because it is a statement that can be tested using data (it is not a question or an opinion)

B

/ 1

- 27 Give one disadvantage of using primary data.

It can take a long time and cost a lot to collect

/ 1

- 28 Lowri is going to investigate the time pupils spend on social media.
Write down a hypothesis that she could test.

A hypothesis is a statement that can be tested with data

Example: Girls spend more time on social media than boys

Girls spend more time on social media than boys.

/ 1

- 29 Explain why it is a good idea to use a pilot survey before asking 500 people.

Mistakes can be found with a few people, which saves time and cost compared with fixing them after 500 people

/ 1

- 30 Sian wants to choose a random sample of 10 pupils from a school with 150 pupils.
Which method would give a random sample?

A: Choose the 10 pupils sitting nearest the front of the hall.

B: Ask the first 10 pupils who arrive at school.

C: Put every pupil's name in a hat and draw out 10 names.

Give a reason for your answer.

In a random sample every pupil has an equal chance of being chosen

C, because every pupil has the same chance of being chosen

/ 1

- 31 Priya is going to investigate how long people wait at a doctor's surgery.
Write down a hypothesis that she could test.

*A hypothesis is a statement that can be tested
with data*

*Example: People wait longer in the morning
than in the afternoon*

*People wait longer in the
morning than in the afternoon.*

/ 1

- 32 Here are three statements.
A: How much fruit do you eat?
B: Fruit is healthy.
C: Year 8 pupils eat more fruit than Year 11 pupils.
Which one could be a hypothesis for a statistical investigation?
Give a reason for your answer.

*C, because it is a statement that can be tested
using data (it is not a question or an opinion)*

C

/ 1

- 33 Give one reason for carrying out a pilot survey.

*To test the questions on a small group, so that
problems can be put right before the main
survey*

*To test the questions on a small
group*

/ 1

34 Bethan wants to choose a random sample of 25 pupils from a school with 300 pupils.

Which method would give a random sample?

A: Ask the first 25 pupils who arrive at school.

B: Choose the 25 pupils sitting nearest the front of the hall.

C: Put every pupil's name in a hat and draw out 25 names.

Give a reason for your answer.

In a random sample every pupil has an equal chance of being chosen

C, because every pupil has the same chance of being chosen

/ 1

35 Here are three statements.

A: People in Cardiff walk more steps each day than people in Swansea.

B: Cardiff is a nicer city than Swansea.

C: How many steps do people walk each day?

Which one could be a hypothesis for a statistical investigation?

Give a reason for your answer.

A, because it is a statement that can be tested using data (it is not a question or an opinion)

A

/ 1

36 Gwen does a pilot survey. Her friends say that question 2 is confusing. What should she do?

Rewrite question 2 so that it is clear and then use the improved questionnaire for the main survey

Rewrite question 2

/ 1

- 37 Mari wants to find out how much exercise pupils take. She asks pupils at the school gym.
Give a reason why the sample is biased.

*The sample is biased because pupils in the gym
take more exercise than most pupils*

The sample is biased

/ 1

- 38 Here are three statements.
A: Do pupils who eat breakfast get higher marks?
B: Breakfast is the best meal of the day.
C: Pupils who eat breakfast get higher marks than pupils who do not.
Which one could be a hypothesis for a statistical investigation?
Give a reason for your answer.

*C, because it is a statement that can be tested
using data (it is not a question or an opinion)*

C

/ 1

- 39 Dylan does a pilot survey with 10 people. Most of them leave question 3 blank. Suggest what he should do.

*Change question 3 (it may be
unclear or have no suitable response
box) before doing the main survey*

/ 1

- 40 Evan wants to find the favourite music of pupils in his school. He asks 20 pupils in the school choir.

Give a reason why the sample is biased.

The sample is biased because choir members probably like different music from other pupils

The sample is biased

1 / 1

- 41 Here are three statements.

A: Houses in Cardiff cost more than houses in Merthyr Tydfil.

B: How much do houses cost?

C: Everyone wants to live in Cardiff.

Which one could be a hypothesis for a statistical investigation?

Give a reason for your answer.

A, because it is a statement that can be tested using data (it is not a question or an opinion)

A

2 / 2

- 42 A list has 75 customers, numbered 1 to 75.

Jon takes a systematic sample of 15 customers from the list.

He picks customer number 1 first, then picks every 5th customer after that.

Write down the numbers of the next three customers chosen.

$$1 + 5 = 6$$

$$6 + 5 = 11$$

$$11 + 5 = 16$$

6, 11, 16

2 / 2

- 43 Carys asks 15 people. Here are the answers.
 Black, Silver, Red, Silver, White, White, Red, White, Red, Silver, Black, Black, Silver,
 Red, Silver
 Complete the tally chart and the frequency column.

Tally chart

Colour of cars passing the school	Tally	Frequency
Black		3
White		3
Silver		5
Red		4

Count each item in the list and tally it

Black 3, White 3, Silver 5, Red 4

2 / 2

- 44 Here are four types of diagram: bar chart, line graph, pie chart, scatter graph.
 Choose the most suitable type of diagram for each task. Give a reason for each.
 (a) To compare the number of pupils who like each of five sports.
 (b) To investigate whether pupils who are taller also have bigger feet.

(a) bar chart, because it compares separate categories

(b) scatter graph, because it shows the relationship between two sets of data

(a) bar chart (b) scatter graph

2 / 2

- 45 A list has 75 customers, numbered 1 to 75.
 Carys takes a systematic sample of 15 customers from the list.
 She picks customer number 1 first, then picks every 5th customer after that.
 Write down the numbers of the next three customers chosen.

$$1 + 5 = 6$$

$$6 + 5 = 11$$

$$11 + 5 = 16$$

6, 11, 16

2 / 2

- 46 Ioan wants to find out how many people in a town would use a new library.
He asks only 5 of the people in a town of 12000.
Give a reason why the results may not be reliable.
How could Ioan improve the reliability of the survey?

*A small sample may not represent the whole group
increasing the sample size makes the results more reliable*

The sample is too small to represent everyone; ask more people

2 / 2

- 47 Here are four types of diagram: bar chart, line graph, pie chart, scatter graph.
Choose the most suitable type of diagram for each task. Give a reason for each.
(a) To show how a family's monthly income is divided between rent, food and other spending.
(b) To compare the number of goals scored by each of six players.

*(a) pie chart, because it shows how a total is shared in proportions
(b) bar chart, because it compares separate categories*

(a) pie chart (b) bar chart

2 / 2

- 48 A school has 150 pupils. Each pupil is given a different number from 1 to 150.
Nerys wants to choose a random sample of 10 pupils.
Describe how she could do this.

the pupils with those numbers are the sample

*Use a random number generator
(or calculator) to pick 10
different numbers from 1 to 150*

2 / 2

- 49 Ioan writes this question for a questionnaire.
"How much money do you spend?"
Write down one thing that is wrong with this question.
Write a better question.

Better: "How much money do you spend on snacks in a week?" with boxes: under £2, £2 to £4.99, £5 to £9.99, £10 or more

There is no time period, and it does not say what the money is spent on

2 / 2

- 50 Here are four types of diagram: bar chart, line graph, pie chart, scatter graph.
Choose the most suitable type of diagram for each task. Give a reason for each.
(a) To show what fraction of pupils in a school travel by each type of transport.
(b) To show how the temperature in a town changes over one week.

(a) pie chart, because it shows each part as a fraction of the whole

(b) line graph, because it shows how a value changes over time

(a) pie chart (b) line graph

2 / 2

- 51 Osian surveys 100 of the pupils in a school of 1000 and 50 of them say they like the new menu.
Osian says: "This proves that exactly half of everyone feels the same."
Give a reason why Osian may be wrong.

It is only a sample, not everyone, so the true result for the whole group could be different

It is only a sample, not everyone

2 / 2

- 52 Megan writes this question for a questionnaire.
"How old are you?"

Response boxes: 0 to $\frac{10}{10}$ to $\frac{20}{20}$ to 30

Write down one thing that is wrong with this question.

Write a better question.

Better: 0 to 9, 10 to 19, 20 to 29, 30 or over

The age boxes overlap (10 and 20 are in two boxes)

/ 2

- 53 Here are four types of diagram: bar chart, line graph, pie chart, scatter graph.
Choose the most suitable type of diagram for each task. Give a reason for each.
- (a) To show how a shop's sales change from month to month in a year.
(b) To compare the number of pupils who like each of five sports.

(a) line graph, because it shows how a value changes over time

(b) bar chart, because it compares separate categories

(a) line graph (b) bar chart

/ 2

- 54 A pictogram uses a large picture of a car for 2012 and a small picture of a car for 2022.
Explain why this diagram is misleading.

The pictures are different sizes, so they exaggerate the difference between the two years

The pictures are different sizes

/ 2

- 55 Gareth writes this question for a questionnaire.
"Do you like football and rugby?"
Response boxes: yes / no
Write down one thing that is wrong with this question.
Write a better question.

It asks two questions at once, so a yes or no answer is unclear
Better: ask about football and rugby in two separate questions

It asks two questions at once

2 / 2

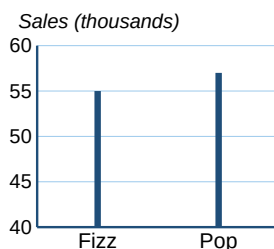
- 56 Priya writes this question for a questionnaire.
"Don't you agree that school lunches are too expensive?"
Write down what is wrong with this question.
Write a better question.

It is a leading question: it suggests the answer the person wants
Better: "What do you think of the price of school lunches?" with boxes: too cheap, about right, too expensive

It is a leading question

2 / 2

- 57 The bar chart shows the sales, in thousands, of two drinks in a month.
A newspaper says: "Pop sells much more than Fizz."
Explain why the bar chart is misleading.



The vertical axis starts at 40, not 0, so the difference looks much bigger than it is (57 compared with 55)

The vertical axis starts at 40, not 0

2 / 2

- 58 Ioan writes this question for a questionnaire.
 "What do you think of the school?"
 Write down one thing that is wrong with this question.
 Write a better question.

Better: ask about one thing, such as "How good is the school library?" with boxes: poor, average, good

It is too vague

/ 2

- 59 Tomos writes this question for a questionnaire.
 "Surely it is wrong to have so many exams. How many exams should pupils sit?"
 Write down what is wrong with this question.
 Write a better question.

It is a leading question: it suggests too many exams is wrong

Better: "How many exams should pupils sit each year?" with boxes: 0 to 2, 3 to 5, 6 or more

It is a leading question

/ 2

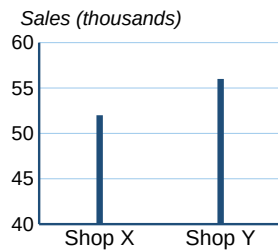
- 60 A list has 40 customers, numbered 1 to 40.
 Gwen takes a systematic sample of 10 customers from the list.
 The first customer chosen is number 2 and the interval is 4.
 Work out the number of the 8th customer chosen.

$$2 + 7 \times 4 = 30$$

30

/ 2

- 61 The bar chart shows the sales, in thousands, of two shops in a month.
A newspaper says: "Shop Y sells much more than Shop X."
Explain why the bar chart is misleading.



The vertical axis starts at 40, not 0, so the difference looks much bigger than it is (56 compared with 52)

The vertical axis starts at 40, not 0

2 / 2

- 62 Gareth writes this question for a questionnaire.
"Everyone knows that the school day is too long. Is it?"
Write down what is wrong with this question.
Write a better question.

It is a leading question: it suggests the answer
Better: "What do you think about the length of the school day?" with boxes: too short, about right, too long

It is a leading question

2 / 2

- 63 A list has 100 customers, numbered 1 to 100.
Iolo takes a systematic sample of 25 customers from the list.
The first customer chosen is number 4 and the interval is 4.
Work out the number of the 15th customer chosen.

$$4 + 14 \times 4 = 60$$

60

2 / 2

- 64 Huw wants to find out if people like fast food. He asks people leaving a burger restaurant.
Give a reason why the sample is biased.
Suggest a better way to choose the sample.

*The sample is biased because people leaving a burger restaurant probably like fast food
Ask a random sample of people from different places*

The sample is biased

2 / 2

- 65 Mari writes this question for a questionnaire.
"Most people think the new sports hall is excellent. How good do you think it is?"
Write down what is wrong with this question.
Write a better question.

*It is a leading question: it pushes people towards saying it is good
Better: "How good is the new sports hall?" with boxes: poor, average, good, excellent*

It is a leading question

2 / 2

- 66 A list has 120 customers, numbered 1 to 120.
Dafydd takes a systematic sample of 15 customers from the list.
The first customer chosen is number 1 and the interval is 8.
Work out the number of the 10th customer chosen.

$$1 + 9 \times 8 = 73$$

73

2 / 2

- 67 The table shows the number of pupils in each year group of a school.
Dafydd takes a stratified sample of 20 pupils.
Work out how many Year 8 pupils he should include in the sample.

Year group	Year 7	Year 8	Year 9	Total
Number of pupils	200	200	100	500

$$200 \div 500 \times 20 = 8$$

8

2 / 2

- 68 Jon collects the times, in seconds, taken by pupils to run 100 metres.
14, 18, 3, 17, 19
(a) Write down the value that is an anomaly.
(b) Work out the mean without the anomaly.

*3 is far bigger or smaller than the others
the other 4 values total 68, and $68 \div 4 = 17$*

(a) 3 (b) 17

2 / 2

- 69 The tally chart shows the answers given by 25 people.
What percentage of the people chose Football?

Favourite sport	Tally
Football	
Rugby	
Netball	
Swimming	

$$9 \div 25 \times 100 = 36\%$$

36%

2 / 2

- 70 Ceri is writing a questionnaire to find out how often people visit the library.
Write down a suitable question and include at least three response boxes.

How many times did you visit the library last month? Boxes: 0, 1 to 2, 3 to 4, 5 or more

How many times did you visit the library last month? Boxes

2 / 2

- 71 Gareth collects the number of texts sent by pupils in one day.
64, 15, 23, 21, 14, 17
(a) Write down the value that is an anomaly.
(b) Work out the mean without the anomaly.

*64 is far bigger or smaller than the others
the other 5 values total 90, and $90 \div 5 = 18$*

(a) 64 (b) 18

2 / 2

- 72 Sam tests this hypothesis: "Older people send fewer text messages than younger people."
The table shows the mean number of texts sent in a day and the range for each group.
Does the data support the hypothesis? Give a reason for your answer.

Summary of the data

Group	Mean	Range
older people	13	8
younger people	17	30

Yes, the mean for older people (13) is lower than the mean for younger people (17), so the data supports the hypothesis

Yes, the mean for older people (13) is lower than the mean for younger people (17)

2 / 2

- 73 Mari is writing a questionnaire to find out how pupils travel to school.
Write down a suitable question and include at least three response boxes.

*How do you usually travel to school? Boxes:
walk, bus, car, bicycle, other*

*How do you usually travel to
school? Boxes*

2 / 2

- 74 Tomos collects the marks of pupils in a test out of 50.
30, 41, 34, 4, 30, 25
(a) Write down the value that is an anomaly.
(b) Work out the mean without the anomaly.

*4 is far bigger or smaller than the others
the other 5 values total 160, and $160 \div 5 = 32$*

(a) 4 (b) 32

2 / 2

- 75 Sam tests this hypothesis: "Year 11 pupils spend more time on homework than Year 9 pupils."
The table shows the mean time on homework (hours per week) and the range for each group.
Does the data support the hypothesis? Give a reason for your answer.

Summary of the data

Group	Mean	Range
Year 11 pupils	10	10
Year 9 pupils	13	5

*No, the mean for Year 11 pupils (10) is lower
than the mean for Year 9 pupils (13), so the
data does not support the hypothesis*

*No, the mean for Year 11 pupils
(10) is lower than the mean for
Year 9 pupils (13)*

2 / 2

- 76 Owen is writing a questionnaire to find out how much time pupils spend on homework in a week.

Write down a suitable question and include at least three response boxes.

How many hours of homework do you do in a week? Boxes: 0 to 1, 2 to 3, 4 to 5, 6 or more

How many hours of homework do you do in a week? Boxes

3 / 3

- 77 Sian collects the times, in seconds, taken by pupils to run 100 metres.

18, 48, 13, 13, 17, 18, 17

(a) Write down the value that is an anomaly.

(b) Work out the mean without the anomaly.

*48 is far bigger or smaller than the others
the other 6 values total 96, and $96 \div 6 = 16$*

(a) 48 (b) 16

3 / 3

- 78 Sam tests this hypothesis: "Girls have a faster reaction time than boys."

The table shows the mean reaction time (seconds) and the range for each group.

Does the data support the hypothesis? Give a reason for your answer.

Summary of the data

Group	Mean	Range
girls	0.35	3
boys	0.31	6

No, the mean for girls (0.35) is higher than the mean for boys (0.31), so the data does not support the hypothesis

No, the mean for girls (0.35) is higher than the mean for boys (0.31)

3 / 3

- 79 Evan will test this hypothesis: "Girls are faster at running 100 metres than boys."
Write down what data he should collect, who he should collect it from and how.

Time a sample of girls and a sample of boys running 100 metres on the same track, in the same conditions, and record the times

3 / 3

- 80 Ceri asks this question in a questionnaire.
"How many hours do you sleep on a school night?"
(a) Write down one thing that is wrong with the response boxes.
(b) Write down a better set of response boxes.

Response boxes

1 to 3	4 to 6	7 to 9	10 or more
--------	--------	--------	------------

(a) There is no box for 0 hours, so some people cannot answer

*(a) There is no box for 0 hours
(b) for example 0 to 2, 3 to 5, 6 to 8, 9 or more*

3 / 3

- 81 Sam tests this hypothesis: "Pupils in 8A score higher marks in a spelling test than pupils in 8B."
The table shows the mean mark in a spelling test and the range for each group.
Does the data support the hypothesis? Give a reason for your answer.

Summary of the data

Group	Mean	Range
8A	14	5
8B	15	7

No, the mean for 8A (14) is lower than the mean for 8B (15), so the data does not support the hypothesis

No, the mean for 8A (14) is lower than the mean for 8B (15)

3 / 3

- 82 Nia will test this hypothesis: "Pupils who sleep for longer get better marks in tests."
Describe how she could collect data to test the hypothesis.

record both for each pupil and compare

Ask a sample of pupils how many hours they slept, and find their test marks

3 / 3

- 83 Ceri asks this question in a questionnaire.
"How many minutes does it take you to get to school?"
(a) Write down one thing that is wrong with the response boxes.
(b) Write down a better set of response boxes.

Response boxes

1 to 10	11 to 20	21 to 30	31 or more
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(a) There is no box for 0 minutes, so some people cannot answer

(a) There is no box for 0 minutes (b) for example 0 to 9, 10 to 19, 20 to 29, 30 or more

3 / 3

- 84 Nerys claims: "Fewer than a quarter of pupils play a musical instrument."
Nerys asks 40 pupils and 22 of them play an instrument.
(a) Work out the percentage of the pupils asked who play an instrument.
(b) Does the survey support Nerys's claim? Give a reason.

*$22 \div 40 \times 100 = 55\%$
compare with 25%*

(a) 55% (b) No, 55% is more than 25%, so it does not support the claim

3 / 3

- 85 Callum will test this hypothesis: "Year 11 pupils spend more time on homework than Year 9 pupils."

Write down what data he should collect, who he should collect it from and how.

do it during the same week

Ask a sample of Year 11 pupils and a sample of Year 9 pupils how many hours of homework they do in a week, using a questionnaire at school

3 / 3

- 86 Ceri asks this question in a questionnaire.
"How many text messages do you send in a day?"

- (a) Write down one thing that is wrong with the response boxes.
(b) Write down a better set of response boxes.

Response boxes

0 to 9	12 to 21	24 to 33	36 or more
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(a) There are gaps between the boxes: 10 is not in any box

(b) for example 0 to 9, 10 to 19, 20 to 29, 30 or more

(a) There are gaps between the boxes

3 / 3

- 87 Sam claims: "Most pupils in the school walk to school."

Sam asks 50 pupils and 26 of them walk to school.

- (a) Work out the percentage of the pupils asked who walk to school.
(b) Does the survey support Sam's claim? Give a reason.

*$26 \div 50 \times 100 = 52\%$
compare with 50%*

(a) 52% (b) Yes, 52% is more than 50%, so it supports the claim

3 / 3

- 88 Iolo will test this hypothesis: "More people use the library on Saturday than on Wednesday." Write down what data he should collect, who he should collect it from and how.

Count the people who enter the library on a Saturday and on a Wednesday, using a tally chart for the same opening hours

3 / 3

- 89 Ceri asks this question in a questionnaire.
"How many books did you read last year?"
(a) Write down one thing that is wrong with the response boxes.
(b) Write down a better set of response boxes.

Response boxes

0 to 3	3 to 6	6 to 9	9 or more
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- (a) The boxes overlap: 3 is in two boxes ("0 to 3" and "3 to 6")
(b) for example 0 to 2, 3 to 5, 6 to 8, 9 or more*

(a) The boxes overlap

3 / 3

- 90 Gareth claims: "More than half of the pupils prefer school lunch to a packed lunch."
Gareth asks 100 pupils and 27 of them prefer school lunch.
(a) Work out the percentage of the pupils asked who prefer school lunch.
(b) Does the survey support Gareth's claim? Give a reason.

*$27 \div 100 \times 100 = 27\%$
compare with 50%*

(a) 27% (b) No, 27% is less than 50%, so it does not support the claim

3 / 3

- 91 Nerys will test this hypothesis: "More cars pass the school gate in the morning than in the afternoon."
Describe how she could collect data to test the hypothesis.

Use a tally chart to count the cars passing the gate for the same length of time in the morning and in the afternoon, on several days

3 / 3

- 92 Ceri asks this question in a questionnaire.
"How much money do you spend on snacks in a week?"
(a) Write down one thing that is wrong with the response boxes.
(b) Write down a better set of response boxes.

Response boxes

1 to 3	4 to 6	7 to 9	10 or more
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(a) There is no box for £0, so some people cannot answer

(a) There is no box for £0 (b) for example 0 to 2, 3 to 5, 6 to 8, 9 or more

3 / 3

- 93 The table shows the number of pupils in each year group of a school.
Liam takes a stratified sample of 40 pupils.
Work out the number of pupils from each year group in the sample.

Year group	Year 7	Year 8	Year 9	Total
Number of pupils	160	160	80	400

Year 7: $160 \div 400 \times 40 = 16$

Year 8: $160 \div 400 \times 40 = 16$

Year 9: $80 \div 400 \times 40 = 8$

Year 7: 16, Year 8: 16, Year 9: 8

3 / 3

- 94 Huw will test this hypothesis: "Most pupils prefer to walk to school."
Write down what data he should collect, who he should collect it from and how.

Ask a random sample of pupils from all year groups how they usually travel to school and tally the answers

3 / 3

- 95 The table shows the mean and range of the waiting times at two clinics.
Compare the distributions of the two groups.
Use the mean to compare the averages and the range to compare the spread.

The waiting times at two clinics

	Mean	Range
Clinic A	30 minutes	23 minutes
Clinic B	35 minutes	30 minutes

The range for Clinic A (23 minutes) is smaller than the range for Clinic B (30 minutes), so the results for Clinic A are more consistent

On average, Clinic B had longer waiting times (mean 35 minutes compared with 30 minutes)

3 / 3

- 96 The table shows the number of pupils in each year group of a school.
Mari takes a stratified sample of 60 pupils.
Work out the number of pupils from each year group in the sample.

Year group	Year 7	Year 8	Year 9	Year 10	Year 11	Total
Number of pupils	80	240	60	80	140	600

Year 7: $80 \div 600 \times 60 = 8$

Year 8: $240 \div 600 \times 60 = 24$

Year 9: $60 \div 600 \times 60 = 6$

Year 10: $80 \div 600 \times 60 = 8$

Year 11: $140 \div 600 \times 60 = 14$

*Year 7: 8, Year 8: 24, Year 9: 6,
Year 10: 8, Year 11: 14*

3 / 3

- 97 The table shows the mean and range of the number of texts sent in one day by two age groups. Compare the distributions of the two groups.
Use the mean to compare the averages and the range to compare the spread.

The number of texts sent in one day by two age groups

	Mean	Range
The adults	75	19
The teenagers	86	30

The range for the adults (19) is smaller than the range for the teenagers (30), so the results for the adults are more consistent

On average, the teenagers sent more texts (mean 86 compared with 75)

3 / 3

- 98 The table shows the mean and range of the marks scored in a spelling test by two classes. Compare the distributions of the two groups.
Use the mean to compare the averages and the range to compare the spread.

The marks scored in a spelling test by two classes

	Mean	Range
Class 9X	41	25
Class 9Y	44	8

The range for class 9Y (8) is smaller than the range for class 9X (25), so the results for class 9Y are more consistent

On average, class 9Y scored higher marks (mean 44 compared with 41)

3 / 3

- 99 The table shows the mean and range of the heights of two groups of plants. Compare the distributions of the two groups.
Use the mean to compare the averages and the range to compare the spread.

The heights of two groups of plants

	Mean	Range
The plants given fertiliser	46 cm	18 cm
The plants given no fertiliser	50 cm	15 cm

The range for the plants given no fertiliser (15 cm) is smaller than the range for the plants given fertiliser (18 cm), so the results for the plants given no fertiliser are more consistent

On average, the plants given no fertiliser were taller (mean 50 cm compared with 46 cm)

3 / 3

- 100** The table shows the mean and range of the weekly pocket money received by two groups of pupils.

Compare the distributions of the two groups.

Use the mean to compare the averages and the range to compare the spread.

The weekly pocket money received by two groups of pupils

	Mean	Range
The Year 7 pupils	£7.08	£4.88
The Year 11 pupils	£9.18	£2.63

The range for the Year 11 pupils (£2.63) is smaller than the range for the Year 7 pupils (£4.88), so the results for the Year 11 pupils are more consistent

On average, the Year 11 pupils received more pocket money (mean £9.18 compared with £7.08)