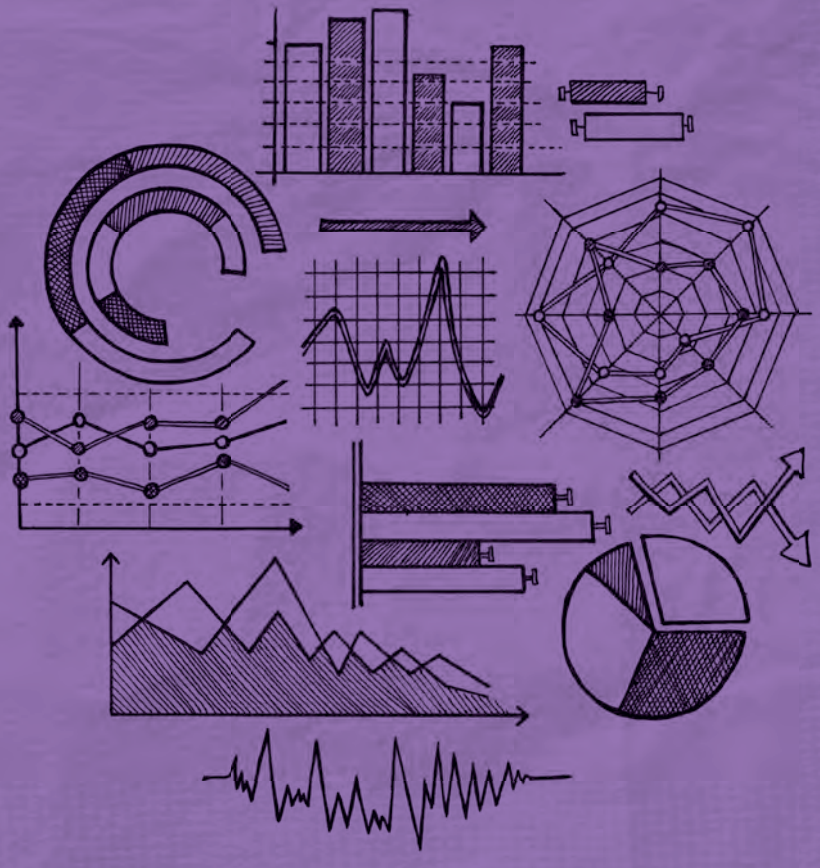
REVISE PEARSON EDEXCEL GCSE (9–1)

Statistics

REVISION WORKBOOK

For the 9–1 exams



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Statistics

REVISION WORKBOOK

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Pearson

Contents

1-to-1 page match with the GCSE Statistics Revision Guide
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A small bit of small print

Edexcel publishes Sample Assessment Material and the Specification on its website. This is the official content and this book should be used in conjunction with it. The questions have been written to help you practise every topic in the book.

Describing data

tier F

Guided

1 Complete the sentences below using one of the following words:

discrete continuous categorical

The weight of a cat is .....continuous..... data.

The number of potatoes in a bag is ..... data.

The colour of a person's eyes is ..... data. **(2 marks)**

tier F

Guided

2 Sandeep recorded the temperature, in °C, of the water on the surface of a lake at 9 am on each of 7 days. Here are his results.

10.1 7.3 9.2 6.3 5.1 8.4 7.2

Is temperature an example of continuous or discrete data?

Give a reason for your answer.

Continuous data because .....

..... **(2 marks)**

tier F

3 Ethan found the weight, in grams, of each of 50 cranberries. Circle the words from the list below that best describe the data he found. **(2 marks)**

You can choose more than one word.

quantitative qualitative discrete

continuous ordinal categorical

tier F

4 Here is a list of statistical words:

discrete continuous bivariate ordinal categorical

Choose the word from the list that best describes the data below.

(a) Number of orange juice cartons on a shelf

..... **(1 mark)**

(b) Length of a football pitch

..... **(1 mark)**

(c) Price and age of second-hand vans

..... **(1 mark)**

(d) Position in a car race

..... **(1 mark)**

tier H

5 Alison is planning to buy a new car. She knows the colour of car and the engine size she wants. Suggest a data item to complete a set of three multivariate data she might consider when choosing her new car.

.....

..... **(2 marks)**

Primary and secondary data

tier F

Guided

1 Kate wants to investigate how the price of a loaf of bread has changed from 2012 to 2017. She finds this information in a table on a government website.

Year	2012	2013	2014	2015	2016	2017
Price (p)	124	130	116	104	100	103

Source: Office for National Statistics

Explain whether this is primary or secondary data.

Secondary data because .....

..... **(1 mark)**

tier F

2 John wants to investigate whether the boys at his school watch more television than the girls at his school. He wants to collect primary data for his investigation.
Describe the difference between primary data and secondary data.

.....

..... **(2 marks)**

tier F

3 Jodie collected data from the internet on the heights of European men and the heights of African men.

(a) State **two** possible problems with obtaining data from the internet.

.....

.....

..... **(2 marks)**

(b) Suggest **one** possible problem with collecting primary data in this situation.

.....

.....

..... **(2 marks)**

tier F

4 A human resources manager is investigating how much time employees at a large company take off due to sickness. The human resources manager plans to collect primary data.
Give a reason why she should do this.

.....

.....

..... **(2 marks)**

tier F

5 Ravina is investigating whether adults are taller now than they were 100 years ago. Should Ravina use primary or secondary data? Give a reason for your answer.

.....

.....

..... **(2 marks)**

Collecting data 1

tier F

Guided

1 Children at a nursery wear shirts of different colours. The colours of the shirts are red, black, white, blue and yellow. Tom is going to count the number of shirts of each colour.
Draw a table Tom could use to record the data he collects. **(3 marks)**

Draw a table with three columns with the colours written in the first column.

Colour		
Red		
Black		

tier F

2 Andrew is going to do a survey to find out the type of vegetable people like best.
Design a suitable data collection sheet for Andrew to use. **(2 marks)**

tier F

3 Here are the numbers of goals scored by a football team in each match last season.

1 4 3 2 2 2 3 4 1 2
3 4 1 2 3 3 4 1 4 3

Use a data collection sheet to record this information. **(3 marks)**

tier F

Guided

4 Jenny asks 50 car owners:

'How old is your car?'

Design a data collection sheet for Jenny to record this information. **(2 marks)**

In this type of question the ages should be written as intervals. Make sure the intervals do not overlap.

Age of car (in years)		
0 to less than 2		
2 to less than 4		

Collecting data 2

tier F&H

Guided

1 A scientist wants to investigate whether a new type of fertiliser helps tomatoes to grow bigger. He plans to run an experiment in a laboratory with tomato plants by growing them in the new fertiliser.

(a) Identify the explanatory and response variables in this experiment.

The explanatory variable is the variable that is going to be investigated.

The response variable is the variable that is the outcome.

Explanatory Fertiliser

Response ..... **(2 marks)**

(b) Describe **one** advantage and **one** disadvantage of doing this as a laboratory experiment.

Advantage

.....

Disadvantage

..... **(2 marks)**

tier F&H

2 A drugs company has invented a new drug that cures acne. The drugs company plans to run an experiment in a hospital with patients who suffer from acne.

(a) Identify the explanatory and response variables in this experiment.

Explanatory .....

Response ..... **(2 marks)**

Here is a list of statistical words:

field laboratory natural

(b) Use one of these words to complete the statement below.

'The company's investigation is a ..... experiment.' **(1 mark)**

(c) Identify **one** possible extraneous variable.

..... **(1 mark)**

tier F&H

3 Isaac wants to find out if dogs are more active in the presence of children.
He is going to carry out a laboratory experiment where dog owners record the activity of their dogs with and without children.
Discuss why laboratory results are more reliable.

.....

.....

..... **(2 marks)**

Collecting data 3

tier F&H

Guided

1 An advert for a brand of weedkiller states the following:

'Kills all weeds growing on your lawn.'

Callum wants to test this claim on his lawn.

(a) Identify the explanatory and response variables in this experiment.

Explanatory *Weedkiller*

Response ..... **(2 marks)**

Here is a list of statistical words:

field laboratory natural

(b) Use one of these words to complete the statement below.

'Callum's investigation is a ..... experiment.' **(1 mark)**

(c) Give **one** advantage and **one** disadvantage of doing this type of experiment.

Advantage

.....

Disadvantage

..... **(2 marks)**

(d) Identify **one** possible extraneous variable.

..... **(1 mark)**

tier F&H

2 Alex wants to investigate the average winter temperature in some cities.
He thinks this will be affected by the altitude of the city above sea level.
He states the following:

'For cities in the same country, the higher the altitude of the city above sea level the lower the winter temperature is.'

(a) Write down

(i) the explanatory variable

.....

(ii) the response variable.

.....

..... **(2 marks)**

(b) Identify **one** possible extraneous variable.

.....

..... **(2 marks)**

Problems with collected data

tier F&H

1 Pierre is going to investigate whether there is a difference in the time spent on reading by boys and by girls during one week at his school.
He writes the following hypothesis for the investigation:

'Girls spend more time reading than boys do in one week.'

Pierre decides to use a census of the 1400 students at his school.
He is going to ask each student to record the time spent, to the nearest minute, on reading during one week.
Pierre collects this information on an online database.

Data record	Gender	Time spent on reading (nearest minute)
1	Male	52
2	Female	44
3	Girl	104
4	Boy	Ninety-one
5	M	24
6	F	41
7	Male	0
8	F	Sixty-one
9	Boy	7
10	G	

(a) Give **two** reasons why Pierre must clean the data before he uses it.

Data must have consistent units, and all records must be complete.

.....

..... **(2 marks)**

(b) Describe **two** ways of improving Pierre's data.

.....

..... **(2 marks)**

Row 10 has data missing.

(c) What might this mean?

..... **(1 mark)**

(d) Discuss **two** ways in which Pierre's data collection plan could affect the reliability of his conclusions.

.....

.....

..... **(2 marks)**

Populations

tier F&H

Guided

1 There are 30 boys in a football squad. The manager needs to find out which exercises the boys want to do at their next training session.
He is going to ask all 30 boys.

(a) Write down the population.

Remember to include the word 'all'.

All the 30 boys **(1 mark)**

(b) Write down the statistical name for an investigation that gets information from every member of the population.

..... **(1 mark)**

(c) Give **one** reason why using a sample of the football squad is not necessary.

..... **(1 mark)**

tier F&H

2 Helena and Nina own a delivery service. They deliver parcels to 40 offices every day.
Helena wants to use a census to collect each of the office managers' opinions.

(a) Write down **one** advantage of using a census.

..... **(1 mark)**

Nina wants to use a sample of the office managers rather than a census.

(b) Give **two** reasons why a sample might be better.

.....

.....

.....

..... **(2 marks)**

tier F&H

3 Alex wants to investigate the numbers of hours spent on homework by all the children at his school last week.
Describe a suitable sampling frame that could be used.

.....

..... **(1 mark)**

tier F&H

4 John wants to find information about the numbers of people travelling in cars in his town.
He is going to take a sample of the cars passing his house one Monday morning.
Explain why John's sample may be biased.

.....

..... **(1 mark)**

Had a go ☐ Nearly there ☐ Nailed it! ☐

Grouping data

tier F

Guided

1 Here are the weights, to the nearest kilogram, of 30 girls.

70	52	61	63	52	62	60	63	58	65
56	67	56	67	68	66	58	59	37	40
68	69	53	59	62	64	45	63	54	64

Suggest suitable class intervals for this data.

$30 < x \leqslant 40$ $40 < x \leqslant 50$ .... x .... x .... **(2 marks)**

tier F

2 Alan records the amount of rainfall, in cm, that falls each day in his village in December.
Here are the results.

2.3	1.5	0.4	1.8	3.5	4.3	1.0	3.0
5.5	4.2	2.2	0	0.9	5.4	3.2	2.7
3.7	2.5	1.9	0.3	0	3.6	0	3.2
2.6	1.3	2.2	1.2	5.8	5.1	3.6	

Suggest suitable class intervals for this data.

Try not to have too many or too few intervals.

.....

.....

..... **(2 marks)**

tier F

3 Andrew is measuring the diameter, in mm, of some metal ropes.
Here are the results.

62.81	70.34	80.43	62.35	63.82	81.61	73.24	83.99	52.35	86.41
88.23	74.43	73.86	64.16	66.43	62.73	58.67	75.38	76.26	85.83
75.94	53.97	78.53	67.77	51.39	69.35	57.85	78.74	72.91	70.85

(a) Suggest suitable class intervals for this data.

.....

.....

..... **(2 marks)**

Andrew measured the diameter of another metal rope.
The diameter of the metal rope was 120.35 mm.

(b) Suggest a new interval to allow for this metal rope.

.....

..... **(1 mark)**

Random sampling

tier F&H

1 Explain what is meant by a random sample.

You must give a clear explanation by using **key** words.

.....

..... **(1 mark)**

tier F&H

Guided

2 There are 180 girls in Year 11 in a school. Seven of these girls are going to represent the school at a charity event. The headteacher decides to use simple random sampling to select the seven girls.
Describe how the headteacher could do this.

You must give **three** points in your answer as this question is worth **three** marks. The first point is done for you.

1 Number all the girls from 0 to 179.

2 .....

3 ..... **(3 marks)**

tier F&H

3 A human resources manager wants to find out what the workers think about the company pension scheme. She plans to use a survey of workers in the company. She decides to use a random sample survey.

(a) Explain what is meant by the word 'random'.

.....

..... **(1 mark)**

There are 1200 workers in the company.
The manager uses a computer to generate the following list of random numbers:

452 879 003 079 178 984 213 567 821 084

(b) Explain how she can use these numbers to select the 10 workers in the sample.

.....

.....

..... **(3 marks)**

(c) Comment on the reliability of her sample.

.....

..... **(1 mark)**

tier F&H

4 A headmaster wants to investigate how many students in the school are vegetarians. There are 1500 students in the school. He takes a sample of 50 of these students so that each of the 1500 students has the same chance of being selected.
Write down the statistical name for this type of sample.

.....

..... **(1 mark)**

Had a go ☐ Nearly there ☐ Nailed it! ☐

Stratified sampling 1

tier F&H

1 A council wants to open an Advice Centre in the city. They want to find out where the residents of the city want the centre to be located. The city is divided into 15 districts. The council will choose between two sampling methods.

Method 1	Method 2
Randomly select residents from each district in proportion to the number of residents in that district.	Select all the residents from three randomly selected districts.
Name of sampling method	
.....	.....

(a) Write down the name of each sampling method in the boxes above. **(2 marks)**

(b) Give **two** advantages of using Method 1 rather than Method 2.

.....

.....

..... **(2 marks)**

tier F&H

2 The table gives information about the ages of the members of a golf club.

Age (years)	16–29	30–39	40–54	55 and over
Number of members	46	63	81	78

The manager is going to take a sample of 40 of these people, stratified by age.
Work out the number of people aged 40–54 years in the sample.

.....

.....

..... **(2 marks)**

tier F&H

Guided

3 A swimming club has members who specialise in only one swimming stroke.
The table gives information about the number of members who specialise in each of the swimming strokes.

Swimming stroke	Freestyle	Backstroke	Breaststroke	Butterfly
Number of members	105	70	110	65

The club coach wants to take a sample of 40 members.
Work out the number of swimmers for each stroke in the sample.

The sample must have the same relative proportions for each stroke as in the whole club.

There must be a whole number of swimmers for each stroke.

Total number of members = 105 + 70 + ... + ... = ...

Freestyle: $\frac{105}{350} \times 40 =$ ..... Backstroke: $\frac{\ldots\ldots}{350} \times \ldots\ldots = \ldots\ldots$

Breaststroke: $\frac{\ldots\ldots}{\ldots\ldots} \times \ldots\ldots = \ldots\ldots$, rounded ..... to .....

Butterfly: $\frac{\ldots\ldots}{\ldots\ldots} \times \ldots\ldots = \ldots\ldots$, rounded ..... to ..... **(4 marks)**

Non-random sampling

tier F&H

1 A company makes bolts. On Monday the company makes 9000 bolts. A systematic sample of 1% of the total number of bolts is going to be taken for testing.

Guided

(a) Describe in detail how this sample should be selected.

1% means choosing one item out of every 100.

Sample every .....th bolt

Start at ..... **(2 marks)**

(b) Give **one** disadvantage of using this sampling method.

.....

..... **(1 mark)**

tier F&H

2 There are 43 police forces in England and Wales. The Police Federation wants to find out the opinions of police officers on a planned change to working hours. They decide to choose five forces at random and survey all the police officers in these forces.

(a) State **one** advantage and **one** disadvantage of using this sampling method.

Advantage

.....

Disadvantage

..... **(2 marks)**

(b) Write down the name of this sampling method.

.....

..... **(1 mark)**

tier H

3 Maria is carrying out an investigation into the amount of time spent by adults reading newspapers. She is going to ask 100 adults some questions. She asks adults going to a library until she has asked 50 men and 50 women.

(a) Write down the name of this sampling method.

.....

..... **(1 mark)**

(b) Give **one** advantage and **one** disadvantage of this sampling method.

Advantage

.....

Disadvantage

..... **(2 marks)**

Had a go ☐ Nearly there ☐ Nailed it! ☐

Stratified sampling 2

tier H

Guided

1 The table shows information about the numbers of people who attended a local charity event.

	Age		
	Under 18	**18–50**	**Over 50**
Male	84	64	95
Female	48	32	77

Sandeep carries out a survey of a sample of the people, stratified by age and gender.
There are 8 people who are male and between the ages 18–50 in his sample.
Work out the number of people who are female and under 18 in his sample.

Work out the total number of people first and then calculate the sample size. The sample size must be smaller than the total number.

Total number of people = 84 + 64 + ... + ... + ... + ... = ...

$$\frac{64}{\text{total}} = \frac{8}{\text{sample size}}$$

$$\text{Sample size} = 8 \times \frac{.....}{64} = ...$$

$$\text{Number of females under 18} = \frac{48}{.....} \times ..... = ...$$

(3 marks)

tier H

2 The table gives information about the numbers of students studying languages at a college.

	Language studied			
	French	**Spanish**	**Italian**	**Total**
Boys	17	33	24	74
Girls	24	13	29	66
Total	41	46	53	140

Ravina is going to take a sample of 30 students, stratified by gender and language studied.
Work out the number of boys studying Spanish in her sample.

.....

..... **(2 marks)**

tier H

3 The table shows information about the activities students choose when they go on an outdoors pursuits programme.

	Climbing	**Sailing**	**Canoeing**
Male	18	35	26
Female	16	42	21

The coach gives a questionnaire to some of the students.
He takes a sample of 30 students, stratified by gender and the activity chosen.
Work out the number of female students who chose canoeing he should have in his sample.

.....

..... **(2 marks)**

Petersen capture-recapture formula

tier H

Guided

1 Jim has a box containing a large number of counters. He wants to find an estimate for the number of counters in the box. Jim takes a sample of 60 counters from the box. He marks each counter with a pen. He then puts the counters back in the box. Jim shakes the box.
He now takes another sample of 50 counters from the box.
6 of these counters have been marked with a pen.
Work out an estimate for the total number of counters in the box.

Let n be the total population. n must be bigger than the size of the sample.

$\frac{60}{n} = \frac{6}{50}$ so $n = \frac{60 \times 50}{6} =$ .....

(2 marks)

tier H

2 Andrew wants to find an estimate for the number of ants in a colony in the ground.
He catches 70 ants from the colony and marks each one with some paint.
He then returns the ants to the colony.
The next day Andrew catches another 80 ants from the colony.
12 of these ants are marked with the paint.

(a) Work out an estimate for the number of ants in the colony.

You cannot have fractions of ants, so give your answer as a whole number, rounding up or down as necessary.

.....

.....

..... **(2 marks)**

(b) Write down any assumptions you have made.

.....

..... **(1 mark)**

tier H

3 Nancy wants to estimate the number of frogs in a lake. She catches a sample of 12 frogs, marks them with some dye and puts them back in the lake.
Later that day, in a second sample of 12 frogs, she finds that 2 of them are marked with the dye.

(a) Work out an estimate for the number of frogs in the lake.

.....

.....

..... **(2 marks)**

(b) How reliable is Nancy's estimate?
Give reasons for your answer.

.....

.....

..... **(2 marks)**

Had a go ☐ Nearly there ☐ Nailed it! ☐

Controlling extraneous variables 1

tier F&H

1 Asha conducted an experiment to investigate the number of calories used by people exercising for different periods of time on a treadmill in the gym.
Asha recorded the number of calories used, in kcal, and the length of time, in minutes, for each person.

(a) What is the explanatory variable in this experiment?

> The explanatory variable is the variable that is going to be investigated.

.....

..... **(1 mark)**

(b) What is the response variable in this experiment?

> The response variable is the variable that is the outcome.

.....

..... **(1 mark)**

(c) Identify an extraneous variable in this experiment and describe how this could be controlled.

> An extraneous variable is a variable that you are not interested in but that could affect the result of the experiment.

.....

..... **(2 marks)**

tier F&H

2 Beverley is carrying out a laboratory experiment to test whether listening to music affects a student's ability to learn multiplication tables.
She is going to give the students 20 questions each and then test each student to see how many questions they can answer correctly.
Beverley is going to repeat the same experiment with all the students listening to music.

(a) What is the explanatory variable in this experiment?

.....

..... **(1 mark)**

(b) What is the response variable in this experiment?

..... **(1 mark)**

(c) Identify **two** extraneous variables in this experiment and describe how they can be controlled.

1 .....

2 ..... **(2 marks)**

tier F&H

3 A researcher wanted to find out if lack of sleep causes more driving errors.
He selected two groups of ten people. Each person in the first group was only allowed 2 hours of sleep. Each person in the second group was allowed 7 hours of sleep.
Both groups sat a Hazard Perception test at a driving centre at 10 am the next morning.
Identify **two** extraneous variables in this experiment and describe how they can be controlled.

1 .....

2 ..... **(2 marks)**

Controlling extraneous variables 2

tier H

1 Some people think that drinking tea before bedtime may help to increase the number of hours of deep sleep. David wants to research this.
Explain why David might use a control group.

.....

..... **(1 mark)**

tier H

Guided

2 A scientist is going to do an experiment on some patients to find out if using a new drug will cure a disease.
The scientist should use a control group.

The control group will test the effectiveness of the drug.

(a) Explain why.

The control group is used to compare the patients who take the new drug with

..... **(1 mark)**

(b) Describe how the scientist would do this.

.....

.....

..... **(2 marks)**

tier H

3 Tanya wants to investigate if children learn the alphabet better with diagrams.
She plans an experiment for her class. She matches the 20 children in her class in pairs.
One child in each pair learns the alphabet using diagrams. The other child in the pair learns the alphabet without using diagrams. After one month, she gives all of the class a test.

(a) Describe how Tanya could match the children in pairs.

Think about similarities among all the children in the same class.

.....

..... **(1 mark)**

(b) Describe a method that Tanya could use to decide which child in each pair should learn the alphabet using diagrams.

.....

..... **(1 mark)**

(c) Matched pair experiments help to reduce the effect of which type of variable?

.....

..... **(1 mark)**

Had a go ☐ Nearly there ☐ Nailed it! ☐

Questionnaires and interviews 1

tier F&H

1 Billy wants to find out how many times people go to the local shop.
He asks this question on a questionnaire:

How many times do you go to the local shop?

1–3	3–6	6–9	9 or more
☐	☐	☐	☐

Write down **two** things that are wrong with this question.

You need to ask yourself: Is there a time frame? Are the response boxes overlapping? Are the response boxes exhaustive?

.....

..... **(2 marks)**

tier F&H

2 A town council wants information about local people's use of the leisure centre.
Two methods of collecting information have been suggested:

Method 1: Ask people at a local supermarket about their use of the leisure centre.

Method 2: Send a questionnaire to all council tax payers.

Which method is likely to give the more reliable results?
Give **one** reason for your answer.

.....

..... **(2 marks)**

tier F&H

3 Rebecca designs a questionnaire to give to customers in her coffee shop.
One question on Rebecca's questionnaire is:

'Do you agree that the cakes are good value for money?'

This is **not** a good question.

(a) Give **one** reason why.

.....

..... **(1 mark)**

Rebecca wants to use face-to-face interviews with the customers in her coffee shop.

(b) Give **one** advantage and **one** disadvantage of using face-to-face interviews rather than a questionnaire given to customers.

Advantage

.....

Disadvantage

..... **(2 marks)**

tier F&H

4 Anna wants to find out how far students live from her school.
She uses this question on a questionnaire:

How far do you live from school?

very near near far very far

Write down **two** things that are wrong with this question.

.....

..... **(2 marks)**

Questionnaires and interviews 2

tier H

Guided

1 A publishing company wants to estimate the proportion of people who photocopied pages from textbooks illegally last month.
They want people to be able to give answers so they designed the survey below.

> Flip a fair coin. Keep the result to yourself.
> • If you get heads on the coin, ignore the question and tick box **A**.
> • If you get tails on the coin, answer the question.
> Have you photocopied pages from any textbook illegally during the last month?
>
> | If yes, tick box **A** | If no, tick box **B** |
> |---|---|
> | ☐ **A** | ☐ **B** |

This method, of deciding whether or not to answer a question by spinning a coin, is called the random response technique.

(a) Explain why this method is used.

.....

.....

..... **(1 mark)**

500 people completed the survey.

(b) Estimate the number of people who got heads on the coin.

$\frac{1}{\ldots\ldots} \times 500 = \ldots\ldots$ **(1 mark)**

270 of the 500 people ticked box A.

(c) Estimate the proportion of people who photocopied pages from textbooks illegally during the last month.

Estimate for the number who ticked box A who were truthful

= ..... − ..... = ...

Estimate for the proportion of people who photocopied pages from textbooks illegally

$= \frac{\ldots\ldots}{500 - \ldots\ldots} = \frac{\ldots\ldots}{\ldots\ldots} = \frac{\ldots\ldots}{\ldots\ldots} = \ldots\ldots = \ldots\ldots\%$ **(2 marks)**

Hypotheses

tier F&H

1 Alan wants to investigate the pressure of gas in gas bottles used for barbecues.
He thinks this will be affected by the age of the gas bottles.
He writes down two statements:

Statement A: Do older gas bottles have lower pressure?

Statement B: The older the gas bottle the lower the gas pressure.

Statement A is **not** a hypothesis.

(a) Explain why.

A hypothesis must be specific and measurable.

.....

..... **(1 mark)**

Alan uses Statement B as his hypothesis.

(b) Write down **two** variables Alan needs to include in his investigation.

Variable 1 .....

Variable 2 ..... **(2 marks)**

tier F&H

2 Sam lives near an airport. He wants to investigate how the distance from the airport affects house prices in the area around the airport.

(a) Write down a hypothesis he could use.

.....

..... **(1 mark)**

(b) Describe how he could collect secondary data to test his hypothesis.

.....

..... **(1 mark)**

tier F&H

3 A researcher is going to investigate the age at which people in Scotland get asthma.
He wants to find out if men get asthma at a younger age than women.

(a) Write down a hypothesis that the researcher could use.

.....

..... **(1 mark)**

It would be difficult for a researcher to use a census.

(b) Write down a reason why.

.....

..... **(1 mark)**

Designing investigations

tier F&H

Guided

1 A council wants to find out what people think of a new cinema. The council sends out a pilot survey to 350 people and gets 250 completed surveys back.
The council wants to get at least 600 completed surveys.

(a) How many people should the council send the full survey to?

Let n = the number of people the survey is sent to. n must be bigger than 600, which is the total number of completed surveys the council wants.

$\frac{250}{350} = \frac{600}{n}$, so $n = \frac{600 \times 350}{250} =$ .....

(2 marks)

The council decides to collect information using a questionnaire.

(b) State **one** advantage and **one** disadvantage of using a questionnaire rather than face-to-face interviews.

Advantage

.....

Disadvantage

..... **(2 marks)**

The following question is used in the council's questionnaire:

'Do you agree that the new cinema was a good use of local taxpayers' money?'

This is **not** a good question.

(c) Give **two** reasons why.

1 .....

.....

2 .....

..... **(2 marks)**

tier F&H

2 Richard is the manager of a large chain of hotels. He wants to investigate the differences between the numbers of sick days taken by employees in different age groups.
He obtains the following information about the ages of the employees.

Age group	Number of male employees	Number of female employees
18–30	72	43
31–50	82	56
51–65	36	43

Assess the suitability of taking a sample of 15 employees stratified by age and by gender, for his investigation

.....

.....

.....

..... **(3 marks)**

Had a go ☐ Nearly there ☐ Nailed it! ☐

Tables

tier F

1 The table shows information about the numbers of house and flat sales with values of £40 000 or more for the years 2015 to 2017.
All figures have been rounded to the nearest ten.

Year	England	Scotland	Wales	Northern Ireland	UK
2015	1 054 370	100 320	51 010	23 880	1 229 580
2016	1 057 820	99 450	53 150	24 600	1 235 020
2017	1 032 610	104 450	56 280	26 390	1 219 730

Source: HM Revenue and Customs

(a) Write down the number of house and flat sales in Northern Ireland in the year 2016.

Find the 2016 row and the Northern Ireland column.

..... **(1 mark)**

(b) Work out the difference between the highest number and the lowest number of house and flat sales per year in England.

Find the highest and lowest numbers in the England column.

.....

..... **(2 marks)**

(c) Describe the trend in the number of house and flat sales in Wales for the years 2015 to 2017.

A trend can be described as upwards, downwards or level.

..... **(1 mark)**

tier F

2 The table shows the Gross Domestic Product (GDP) and the population of the United Kingdom for the years 2016 to 2019.

Year	UK GDP (£ billion)	UK population (million)	GDP per capita (£000s)	
2016	1885.5	64.768	29 112	actual
2017	1962.9	65.200	30 106	actual
2018	2029.5	65.635	30 921	estimate
2019	2094.8	65.073	32 192	estimate

Source: budgetresponsibility.org.uk

GDP per capita is the GDP per person in the country.

(a) Write down the year in which the GDP per capita is the lowest.

..... **(1 mark)**

(b) Write down the year in which the data shows a fall in the population of the UK.

..... **(1 mark)**

(c) Describe the trend in the GDP of the UK.

..... **(1 mark)**