GCSE Statistics: Grade 3

Worked solutions

GCSE Statistics practice

1 POPULATION, CENSUS AND SAMPLE

A head teacher wants to find out what the 900 pupils at her school think about school lunches. She asks 50 of the pupils.

a. Write down the population for this investigation.

b. Is the head teacher taking a census or a sample?

c. Give one advantage of asking 50 pupils instead of all 900 pupils.

d. Give one disadvantage of asking only 50 pupils.

(4 marks)

a) everyone she wants to find out about

ALL 900 pupils at the school

b)

She only asks part of the population

It is a sample

c)

It is quicker and there is less data to handle

d)

The 50 pupils may not represent

the views of the whole school

a) 900 pupils b) sample c) quicker d) not representative

2 WRITING A HYPOTHESIS

Leila thinks that older pupils spend more time on homework. She is going to investigate the pupils in Year 7 and Year 11 at her school.

a. Write down a suitable hypothesis for Leila to test.

b. Write down two pieces of data Leila needs to collect from each pupil.

(3 marks)

a) a statement that can be tested with data

Year 11 pupils spend more time on homework

each week than Year 7 pupils

b)

The year group of the pupil

The time spent on homework in a week

a) Year 11 spend more time b) year group, time

Free for classroom and home use: print, photocopy and share. Not for resale or re-hosting.

3 QUESTIONNAIRES AND BIASED QUESTIONS

Dan writes a questionnaire about a sports centre. Here are two of his questions.

Question 1 Do you agree that the new sports centre is brilliant?

☐ Yes ☐ No

Question 2 How many times do you visit the sports centre?

☐ 1 to 3 ☐ 3 to 5 ☐ 5 to 7

a. Write down one thing that is wrong with Question 1.

b. Write down two things that are wrong with the response boxes for Question 2.

c. Write a better question for Question 2. Include some response boxes.

(5 marks)

a)

It is a leading question

It pushes people to answer Yes

b)

The boxes overlap

3 and 5 are each in two boxes

There is no box for 0 or for more than 7

c) add a time frame, boxes with no gaps or overlaps

How many times did you visit

the sports centre last month?

0, 1 to 2, 3 to 4, 5 to 6, 7 or more

a) leading b) overlap, no 0 box c) see question above

4 STEM AND LEAF DIAGRAMS

The stem and leaf diagram shows the ages, in years, of the members of a walking club.

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

Key: 2 | 4 means 24 years

a. How many members does the club have?

b. Write down the mode.

c. Find the median age.

d. Work out the range of the ages.

(4 marks)

a) count the leaves

3 + 4 + 6 + 2 = 15

Free for classroom and home use: print, photocopy and share. Not for resale or re-hosting.

b) the leaf 6 appears 3 times in the 4 row

mode = 46

c) position of the median

$(15 + 1) \div 2 = 8$

24, 27, 29, 31, 35, 35, 38, 40

The 8th value is 40

d) range = highest - lowest

$57 - 24 = 33$

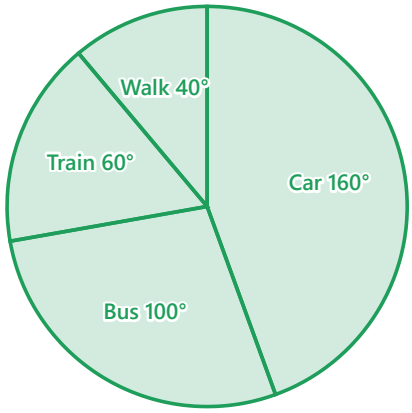
a) 15 b) 46 c) 40 d) 33

5 **DRAWING PIE CHARTS**

90 workers at a factory were asked how they travel to work. The table shows the results.

Method of travel	Car	Bus	Train	Walk
Number of workers	40	25	15	10

Draw an accurate pie chart to show this information.



(4 marks)

angle for each worker

$360 \div 90 = 4^\circ$

Car $= 40 \times 4$

$= 160^\circ$

Bus $= 25 \times 4$

$= 100^\circ$

Train $= 15 \times 4$

$= 60^\circ$

Walk $= 10 \times 4$

Free for classroom and home use: print, photocopy and share. Not for resale or re-hosting.

$= 40^\circ$

check the angles add up to 360°

$160 + 100 + 60 + 40 = 360$

measure each angle with a protractor

Label each sector

Car 160°, Bus 100°, Train 60°, Walk 40°

6 **SCATTER DIAGRAMS AND CORRELATION**

A kiosk in a park sells hot drinks. The scatter diagram shows the midday temperature and the number of hot drinks sold on each of 8 days.

The table shows the information for two more days.

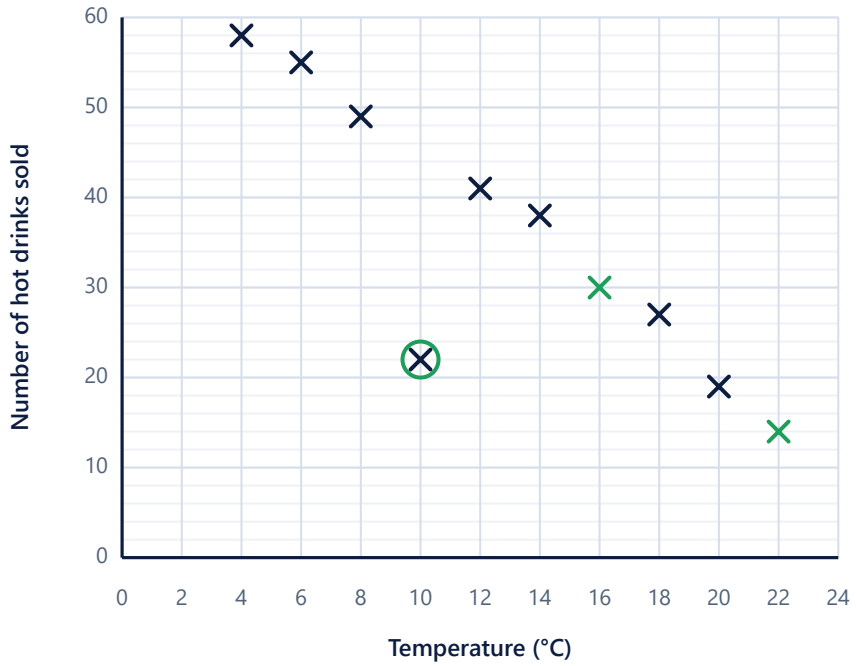
Temperature (°C)	16	22
Number of hot drinks sold	30	14

a. Plot the information from the table on the scatter diagram.

b. Describe the type of correlation shown.

c. Interpret the correlation in context.

d. On one of the days the kiosk closed early. Write down the temperature on that day. Give a reason for your answer.



(4 marks)

a)

Plot crosses at (16, 30) and (22, 14)

b) the points go down from left to right

Negative correlation

c)

As the temperature goes up

Free for classroom and home use: print, photocopy and share. Not for resale or re-hosting.

the number of hot drinks sold goes down

d) Look for a point away from the others

(10, 22) is far below the other points

Days at 8 °C and 12 °C sold 49 and 41

a) plotted b) negative c) hotter, fewer sold d) 10 °C

7 **MEAN FROM A FREQUENCY TABLE**

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

Number of goals	0	1	2	3	4
Frequency	3	6	5	4	2

a. Work out the mean number of goals scored per match.

b. Write down the mode.

(4 marks)

a) goals × frequency for each column

$0 \times 3 = 0$

$1 \times 6 = 6$

$2 \times 5 = 10$

$3 \times 4 = 12$

$4 \times 2 = 8$

total number of goals

$0 + 6 + 10 + 12 + 8 = 36$

mean = total goals ÷ total frequency

$36 \div 20 = 1.8$

b) highest frequency is 6

mode = 1 goal

a) 1.8 goals b) 1 goal

Free for classroom and home use: print, photocopy and share. Not for resale or re-hosting.

8 **EXPERIMENTAL PROBABILITY AND EXPECTED FREQUENCY**

Ewa thinks a spinner may be biased. She spins it 40 times. The table shows her results.

Colour	Red	Blue	Green
Frequency	14	10	16

a. Use the results to estimate the probability that the spinner lands on green.

b. Ewa is going to spin the spinner 200 times.
Work out an estimate for the number of times it will land on green.

c. Write down one way Ewa could get a more reliable estimate of the probability.

(4 marks)

a) green 16 times out of 40 spins

$\frac{16}{40} = \frac{2}{5}$

This is the same as 0.4

b) probability × number of spins

$\frac{2}{5} \times 200 = 80$

c)

Do more spins

More trials give a more reliable estimate

a) $\frac{2}{5}$ b) 80 c) more spins

Free for classroom and home use: print, photocopy and share. Not for resale or re-hosting.