Please check the examination details below before entering your candidate information

Candidate surname	Other names

Pearson Edexcel
Level 1/Level 2 GCSE (9–1)

Centre Number | | | | | |

Candidate Number | | | | |

Thursday 12 November 2020

Afternoon (Time: 1 hour 30 minutes) | Paper Reference **1ST0/1F**

Statistics

Paper 1
Foundation Tier

You must have:
Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, scientific calculator.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- Scientific calculators may be used.
- You must **show all your working out** with **your answer clearly identified** at the **end of your solution**.

Information

- The total mark for this paper is 80
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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P 6 2 7 1 2 A 0 1 2 4

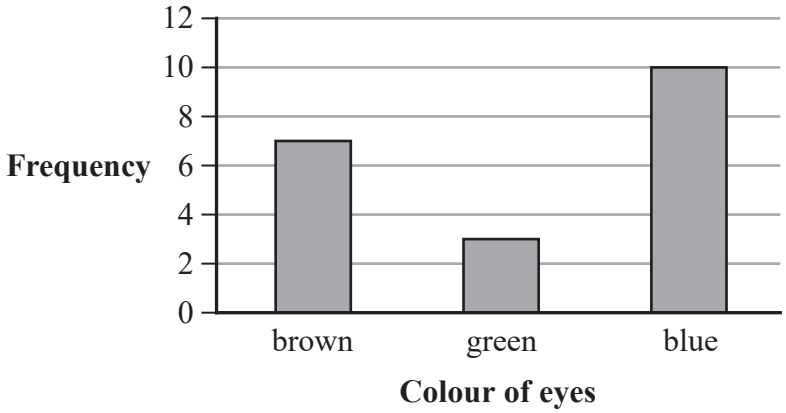
Pearson

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Jon is investigating the colour of the eyes of all the students at his school.
He recorded the colour of the eyes of a sample of 20 students in his class.



(a) Work out how many of these students do **not** have brown eyes.

.....

(1)

One of these students is selected at random.

(b) Describe the likelihood that this student has grey eyes.

.....

(1)

This question must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

(c) For Jon's investigation, which statistical term best describes all of the students at Jon's school?

sample frame ☐ **sample** ☐ **population** ☐ **bias** ☐

(1)

(d) Explain whether or not Jon could use his results to determine the most common colour of the eyes of teachers in his school.

.....

.....

(1)

(Total for Question 1 is 4 marks)

2 Dalia works in a cafe.

One Monday morning she recorded what type of milk each customer wanted in their coffee.

The tally chart gives the number of customers who wanted whole milk or skimmed milk or soya milk or no milk.

Type of milk	Tally	Frequency
Whole	𝍸	5
Skimmed	𝍸 |	6
Soya	𝍸 |||	8
No milk	|||	3
Oat		
Almond		
	Total	

The list below gives the type of milk wanted by each of the other customers.

oat	oat	almond	oat
almond	almond	oat	almond
almond	almond	almond	

(a) Complete the tally chart.

(3)

(b) Write down the type of milk that is the mode.

.....

(1)

On Tuesday, Dalia again recorded what type of milk each customer wanted in their coffee.

The table below gives information about her results.

Type of milk	Whole	Skimmed	Soya	No milk	Oat	Almond	Total
Frequency	7	7	6	2	5	8	35

(c) Determine whether or not both days have the same mode.
You must give a reason for your answer.

.....

.....

.....

(2)

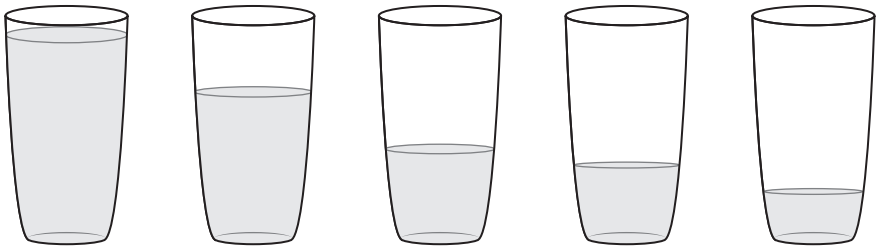
(Total for Question 2 is 6 marks)

3 The table shows information about the mean amount of water used per person per day in each of five countries.

Country	USA	Mexico	UK	China	Haiti
Amount of water used per person (litres)	575	366	149	86	15

(Source: *United Nations Development Program*)

Here is a visual representation of the data.



575 litres | 366 litres | 149 litres | 86 litres | 15 litres

Discuss whether or not this is an appropriate way to represent this information.

.....

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.....

.....

(Total for Question 3 is 3 marks)

4 Some students in Year 9, in Year 10 and in Year 11 at a school were asked to name their favourite meal.

The two-way table gives some information about the favourite meal of each of these students.

	Breakfast	Lunch	Dinner	Total
Year 9	13	7		32
Year 10	8			
Year 11	10	7	18	35
Total		23	40	94

(a) Write down the number of Year 9 students whose favourite meal is lunch.

.....

(1)

(b) Complete the two-way table.

(2)

One of the students is selected at random.

(c) (i) Which meal is least likely to be this student's favourite meal?

.....

(1)

(ii) Write down the probability that this student is in Year 11

.....

(1)

(iii) Find the probability that this student's favourite meal is either lunch or dinner.

.....

(1)

(iv) Given that this student is in Year 9, find the probability that this student's favourite meal is breakfast.

.....

(1)

(Total for Question 4 is 7 marks)

5 People who completed higher education were asked what they were doing six months after they graduated.

The table shows information about the answers given by those who completed higher education in the UK for the years 2013 to 2017

	2013	2014	2015	2016	2017
UK work	282 620	288 075	272 125	263 560	267 320
Overseas work	15 210	15 110	14 205	13 855	14 515
Combination of work and further study	29 120	26 640	22 865	22 110	22 715
Further study	54 930	51 590	51 600	58 715	60 330
Total in work or further study	**381 875**	**381 420**	**360 800**	**358 240**	**364 880**
Unemployed	27 455	23 635	20 600	19 235	18 970
Other	18 265	19 185	17 955	17 475	17 070
Total of known destination	**427 600**	**424 235**	**399 355**	**394 950**	**400 920**
Explicit refusal	18 950	18 735	16 840	18 000	18 200
Total respondents	**446 550**	**442 970**	**416 195**	**412 950**	**419 120**
Non-response	123 230	121 025	112 340	116 490	123 415
Total completing higher education	**569 780**	**563 995**	**528 535**	**529 445**	**542 535**

(Source: *Higher Education Statistics Agency*)

(a) Write down the number of people in 2016 who answered Overseas work.

.....

(1)

(b) Write down all years in which the number of Non-response was greater than 120 000

.....

(1)

(c) Between which two consecutive years did the greatest increase in the number of people answering Further study take place?

..... and .....

(1)

For one of the categories in the table, the number of people decreased each year from 2013 to 2017

(d) Write down this category.

.....

(1)

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Here are two methods that could have been used to collect this information.

Method 1: Conduct a face to face interview with each person who completed higher education.

Method 2: Send an email to each person who completed higher education inviting them to complete an online survey.

(e) State which of Method 1 or Method 2 is the more appropriate method to use. Give a reason for your answer.

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(2)

(Total for Question 5 is 6 marks)

6 Sam works in a bank.

He wants to survey the people who work at the bank in order to investigate whether there is a relationship between a person's height and the person's salary.

(a) Suggest a hypothesis for Sam's investigation.

.....

(1)

Sam plans to collect the data himself.

(b) Complete correctly the sentence below.

Data collected by the person who is going to use the data is called ..... data.

(1)

(c) Explain why Sam may have difficulty in collecting data about people's salaries.

.....

.....

(1)

The list below contains some variables that Sam is planning to collect.

salary height age

(d) The variables that Sam is planning to collect are all examples of which type of data?

.....

(1)

Sam decides to take a sample of employees by putting the name of everyone who works at the bank in a list in alphabetical order and selecting every 5th name on the list.

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

.....

(1)

Part of a spreadsheet of data that has been collected by Sam is given below.

	A	B	C	D
1	Employee	Salary	Height	Age
2	1	32 000	5'11"	41
3	2	1500/month	175	25
4	3	£18 500	180	23
5	4	25 000	6 foot	30
6	5	8000	178	45

Sam tries to use his spreadsheet to calculate automatically the mean salary, the mean height and the mean age of the employees in his sample.

Sam's computer gives him an error message for two of these calculations.

(f) Write down the calculation for which there is **not** an error message.
Give a reason why there is an error message for the other two variables.

.....

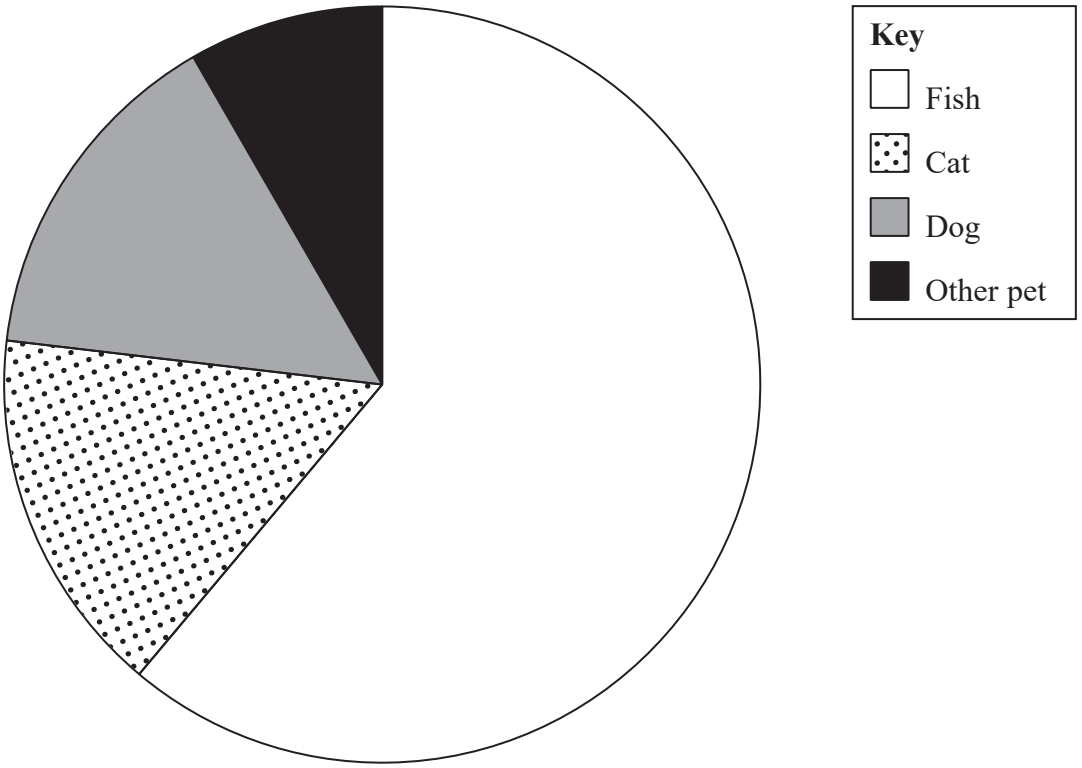
.....

.....

(2)

(Total for Question 6 is 7 marks)

7 The accurately drawn pie chart shows information about the proportions of the total pet population of the UK in 2017 for animals of different types that are kept as pets.



(Source: *https://pfma.org.uk/*)

(a) Explain how the pie chart shows that fish made up the largest proportion of the total pet population of the UK in 2017

.....

.....

(1)

The total pet population in the UK in 2017 was estimated to be 54 million.

(b) Calculate an estimate for the number of fish in the total pet population of the UK in 2017

..... million

(2)

Melanie takes a random sample of 30 pet owners in her town and records the number of pets they each have.

She produced the following table for her results.

Number of pets owned	Frequency
1	12
2	9
3	3
4	4
5	2

(c) For Melanie's sample, find the upper quartile of the number of pets owned.

.....

(1)

(d) Give an interpretation of the value of the upper quartile.

.....

.....

(1)

From this sample, Melanie concluded that everyone in her town owns at least 1 pet.

(e) Comment on the validity of Melanie's conclusion.

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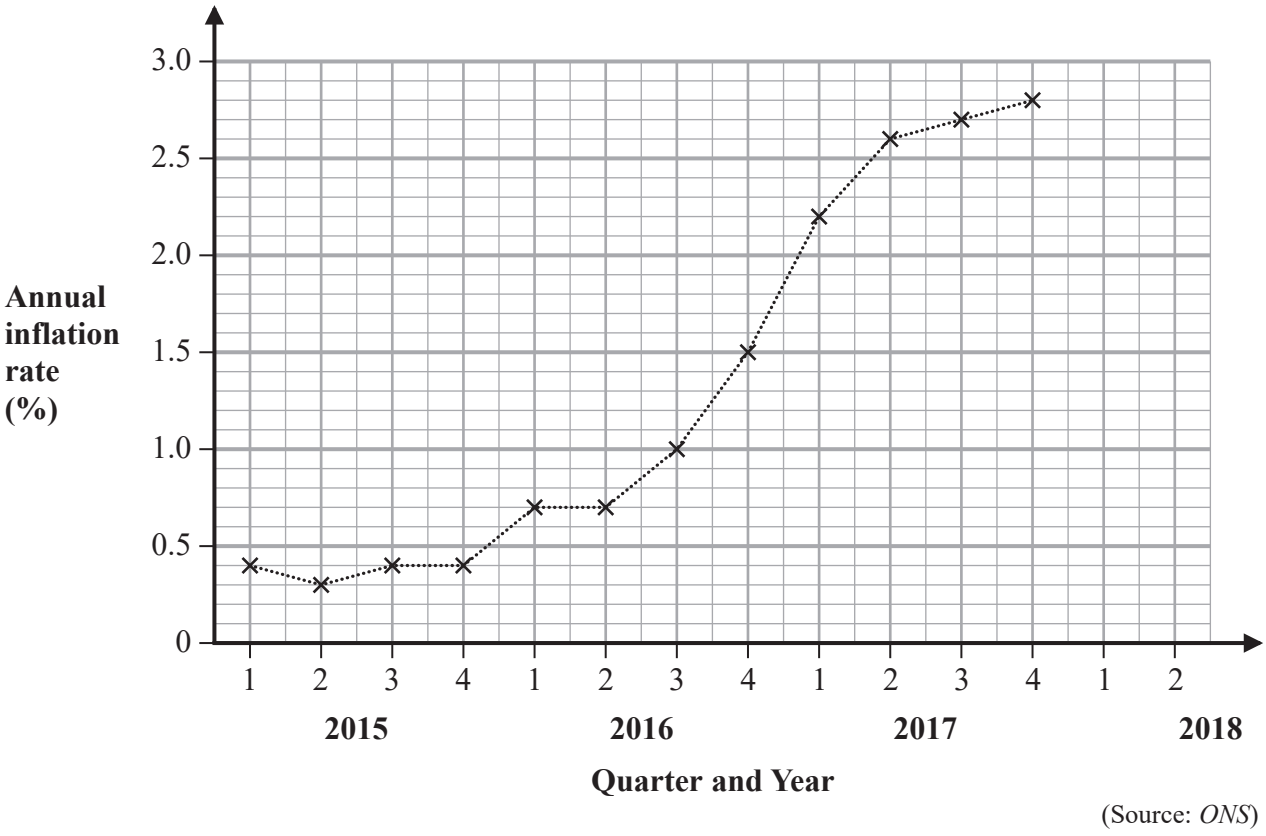
(2)

(Total for Question 7 is 7 marks)

8 The time series graph shows information about the annual inflation rate in the UK each quarter from 2015 to 2017



(Source: *ONS*)

(a) Describe and interpret the trend in the annual inflation rate from 2015 to 2017

.....

.....

(2)

The table gives the annual inflation rate for the first two quarters of 2018

	Q1 2018	Q2 2018
Annual inflation rate (%)	2.5	2.2

(b) Plot this information on the time series graph.

(2)

(c) Show that the first 4-point moving average for the data values in the time series graph is 0.375

(1)

Alex wants to use the time series graph to describe the changes in the annual inflation rates.

He subtracts the annual inflation rate of the first data point from the annual inflation rate of the last data point on the time series graph.

(d) Explain whether or not this is an appropriate method for Alex to use.

.....

.....

.....

(2)

(Total for Question 8 is 7 marks)

9 Cindy works in a library.

She recorded the number of books borrowed by each person in a random sample of 20 people who borrowed books from the library one Monday.

The table gives information about her results.

Number of books borrowed on Monday	Frequency
1	10
2	5
3	4
4	1

Cindy also recorded the number of books borrowed by each person in a random sample of 20 people who borrowed books from the library one Friday.

The table gives two summary statistics for her results.

	Mean	Range
Books borrowed on Friday	1.5	2

She claims that the mean number of books borrowed from the library on a Monday is greater than the mean number of books borrowed from the library on a Friday.

Cindy also claims that there is a smaller spread in the number of books borrowed from the library on a Monday than on a Friday.

(a) Comment on whether each of Cindy's claims is supported by her results.
You must give reasons for your answers.

.....

.....

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(5)

Suzanne suggests repeating the investigation with a larger number of Mondays and Fridays.

(b) Give a reason why Suzanne's suggestion may be appropriate.

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.....

(1)

(Total for Question 9 is 6 marks)

10 A presenter wants to get feedback on a lecture that she gave.

There were 467 students at the lecture.

The presenter plans to give a questionnaire to a sample of 50 of these students.

One of the questions on the questionnaire is

> To what extent do you agree with the statement, the presenter was knowledgeable?
>
> Use a scale from 0 to 5, where 0 means **I strongly disagree** and 5 means **I strongly agree**

(a) Circle the word from the list that best describes the type of data that this question collects.

ordinal **bivariate** **continuous** **grouped**

(1)

(b) Describe how the presenter can use a list of random numbers to select a simple random sample of 50 students.

.....

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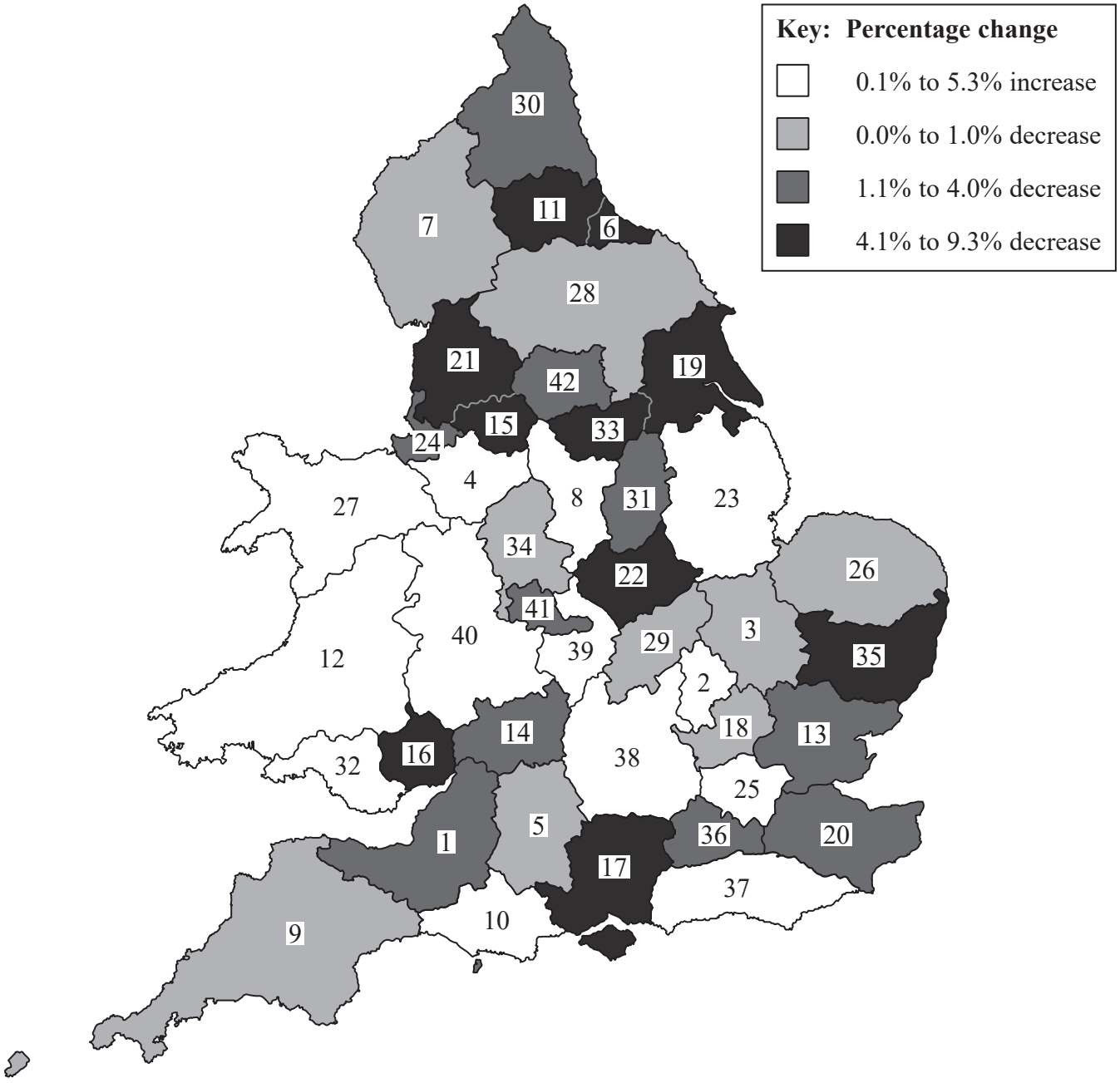
(3)

(Total for Question 10 is 4 marks)

11 The map below gives information about the percentage change in the number of police officers in each of the 42 different police force regions of England and Wales between 2014 and 2015



(Source: *ONS*)

(a) Write down the percentage change in the number of police officers in region 17

.....

(1)

(b) In how many of the 42 regions did the number of police officers increase?

.....

(1)

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Sadiq thinks that the map shows that there was a decrease in the overall number of police officers in England and Wales between 2014 and 2015

(c) Explain why Sadiq may **not** be correct.

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(1)

(d) Write down the statistical name for the type of map used in this question.

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(1)

(Total for Question 11 is 4 marks)

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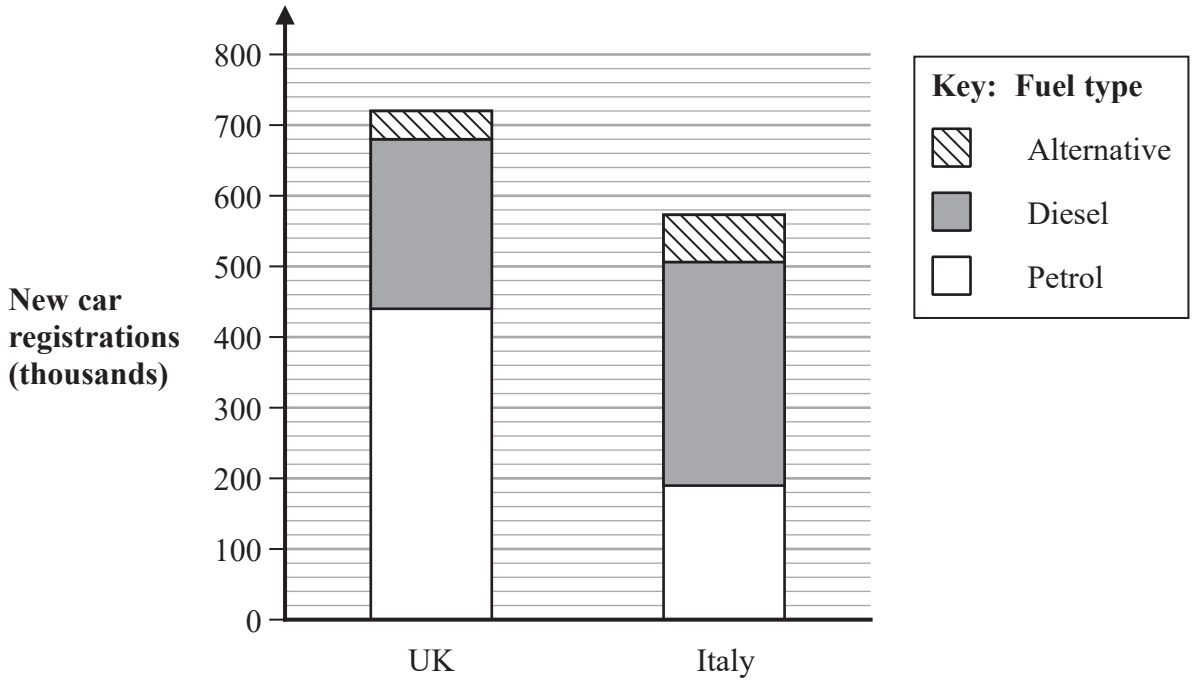
12 The composite bar chart shows information about the number of new car registrations for the first quarter of 2018 in the UK and in Italy for each fuel type.



(Source: *European Automobile Manufacturers Association*)

In total, there were more new car registrations in the UK than in Italy.

(a) Work out an estimate for how many more.

..... thousand

(2)

(b) Explain why the answer to part (a) is an estimate.

.....

.....

(1)

(c) For each fuel type, compare the number of new car registrations in the UK with the number of new car registrations in Italy.

.....

.....

.....

.....

(2)

The table below shows the number of alternative fuel new car registrations in the UK for the first quarter of each year from 2015 to 2017

	Q1 2015	Q1 2016	Q1 2017
Alternative fuel new car registrations	20 785	25 707	33 405

Michael says that the information in the table shows that the total number of alternative fuel new car registrations in the UK for 2015 to 2017 increased each year.

(d) Explain why Michael's conclusion may **not** be valid.

.....

.....

(1)

(Total for Question 12 is 6 marks)

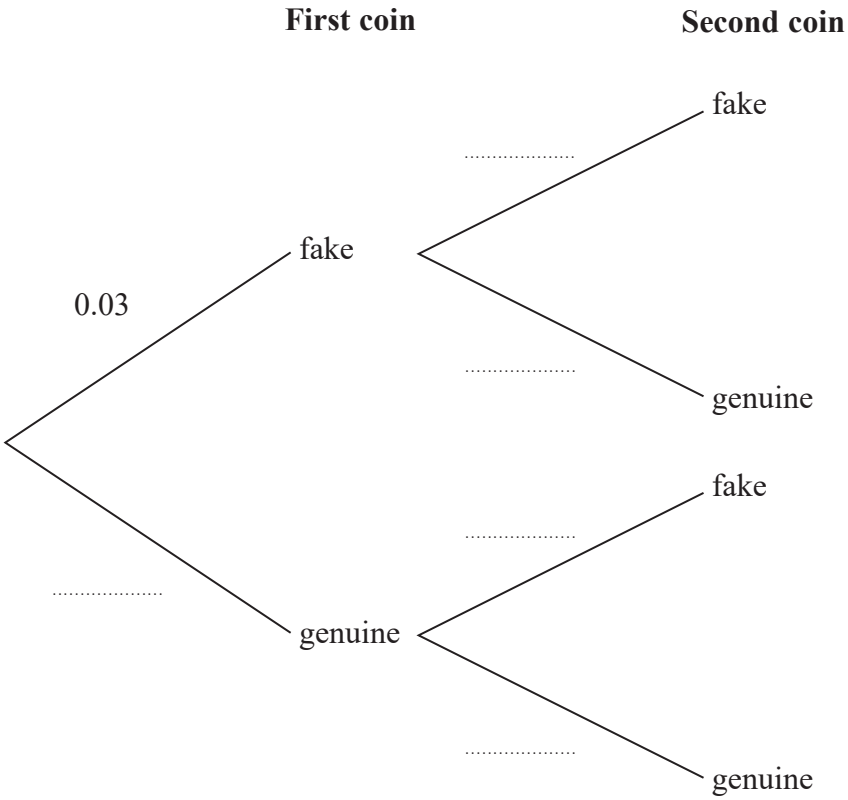
13 It was reported that 3% of the old style £1 coins are fake.

All the other old style £1 coins are genuine.

Shreya has two old style £1 coins.

She does not know if each coin is genuine or fake.

(a) Complete the probability tree diagram.



(2)

(b) Show that the probability that both of Shreya's coins are genuine is 0.9409

(1)

Shreya claims that the probability that exactly one of her two coins is fake is less than 6%

(c) Determine whether or not Shreya is correct.

(3)

(Total for Question 13 is 6 marks)

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14 Joel is investigating the heights of buildings in Paris and in London. He collects data on the heights of the tallest buildings in Paris and in London.

Joel decides to remove the height of the tallest building from each of his two data sets before carrying out the investigation.

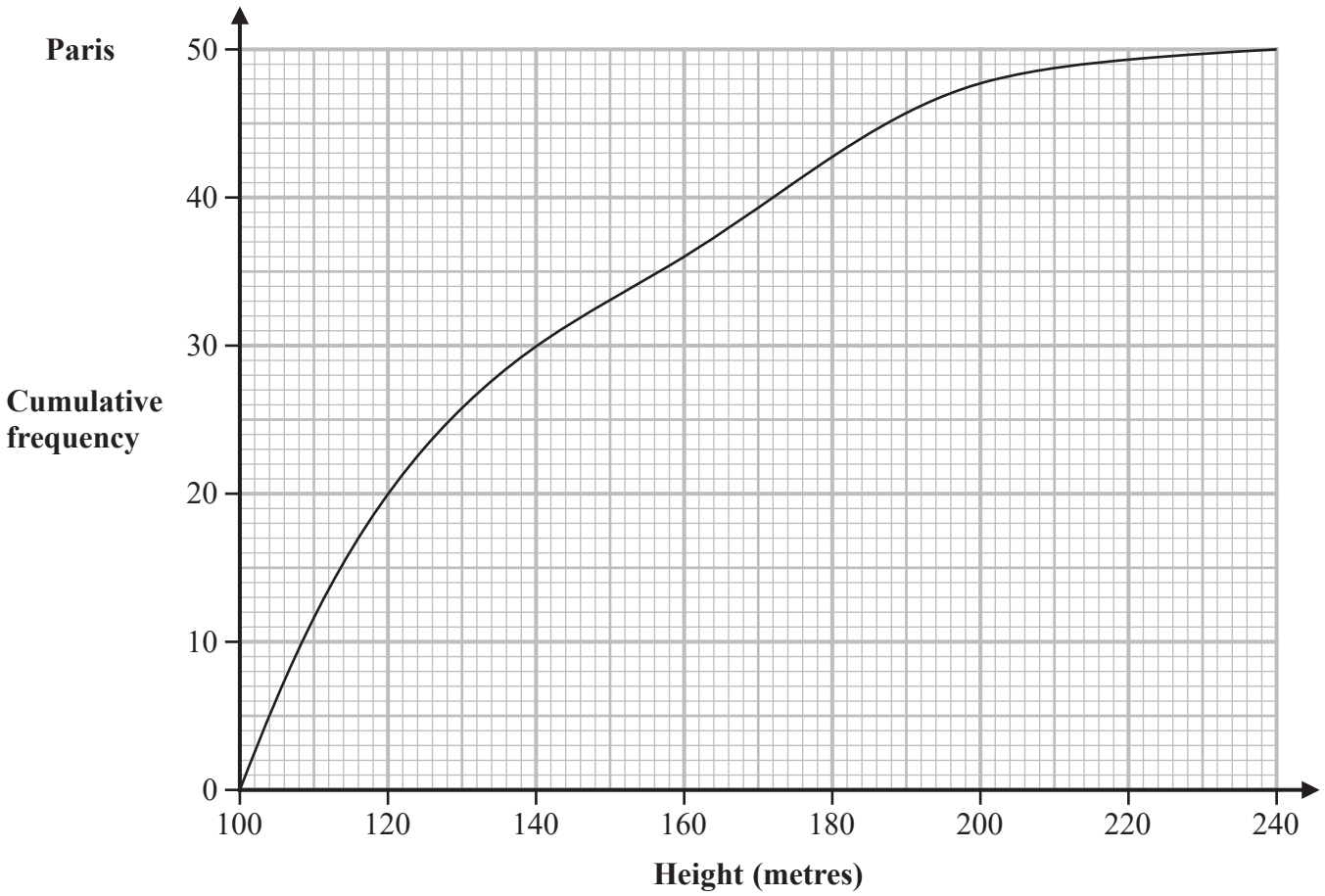
(a) Suggest a reason why it may be appropriate for Joel to do this.

.....

.....

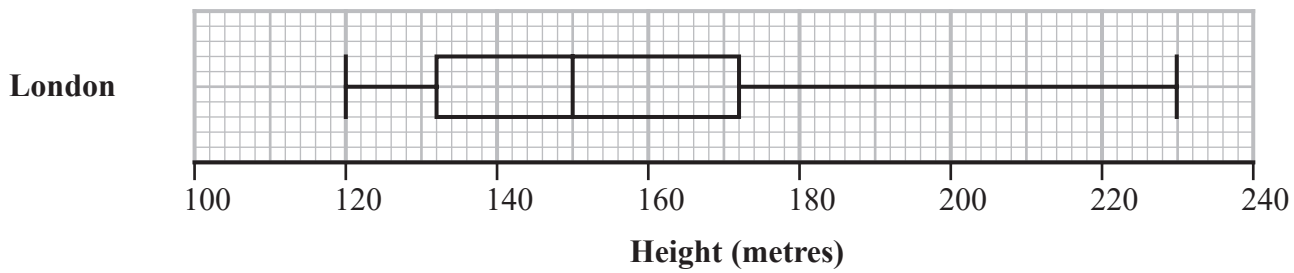
(1)

The cumulative frequency diagram shows information about the heights, in metres, of a sample of 50 of the tallest buildings in Paris.



(Source: *Wikipedia*)

The box plot shows information about the heights, in metres, of a sample of 50 of the tallest buildings in London.



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(b) Compare the distribution of the heights of the tallest buildings in Paris with the distribution of the heights of the tallest buildings in London.

You should give the value of any statistic that you use in your comparisons.

(6)

(Total for Question 14 is 7 marks)

TOTAL FOR PAPER IS 80 MARKS

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