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 | | | | |

Tuesday 18 June 2019

Morning (Time: 1 hour 30 minutes) | Paper Reference **1ST0/2F**

Statistics

Paper 2
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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Pearson

Answer ALL questions.

Write your answers in the spaces provided.

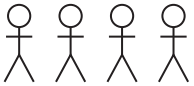
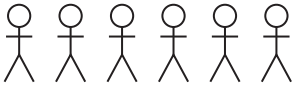
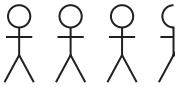
You must write down all the stages in your working.

1 Jools surveyed 40 members of his youth club to ask each of them their favourite type of music.

Some information about his results is shown in the incomplete table.

Favourite type of music	Number of members
Hip-hop	.....
Indie rock	.....
Metal	4
Pop	12
R&B	7
Other	4

The diagram below shows the results of his survey.

Hip-hop	
Indie rock	
Metal	
Pop	
R&B	
Other	

Key:

 represents 2 members

(a) Write down the name of this type of diagram.

.....

(1)

(b) Using the information in the diagram, complete the table.

(2)

(c) (i) Write down the mode of the favourite type of music.

.....

(1)

(ii) Explain why the mode is the appropriate average to use for Jools' results.

.....

(1)

(d) Explain whether or not the diagram shown is a good way to represent Jools' results.

.....

.....

.....

(2)

Jools selected at random one of the 40 members surveyed.

(e) Write down the probability that this member's favourite type of music is R&B.

.....

(1)

(Total for Question 1 is 8 marks)

2 The employees in an office were asked the following question.

"How generous do you feel is the amount of time allowed for your lunch break?"

This is **not** a good question.

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

.....

.....

.....

.....

.....

(2)

The 20 employees in the office work in one of two teams.

Team A	8 employees
Team B	12 employees

One employee from Team A is selected at random and one employee from Team B is selected at random.

Nabir is in Team A and Jenny is in Team B.

(b) (i) Write down the probability that Nabir is selected.

.....

(1)

(ii) Write down the probability that Jenny is selected.

.....

(1)

(iii) Who is more likely to be selected, Nabir or Jenny?
Give a reason for your answer.

.....

.....

(1)

(Total for Question 2 is 5 marks)

3 The table shows information about the sales of cars in the UK for the 14 top selling makes of car in September 2016 and in September 2017

Make	September 2016		September 2017		% change in sales
	sales	market share (%)	sales	market share (%)	
Ford	49 078	10.45	39 696	9.31	–19.12
Volkswagen	33 722	7.18	36 332	8.53	7.74
BMW	32 595	6.94	31 465	7.38	–3.47
Mercedes-Benz	31 988	6.81	31 430	7.37	–1.74
Vauxhall	41 697	8.88	31 058	7.29	–25.52
Audi	31 113	6.62	29 619	6.95	–4.80
Nissan	27 807	5.92	28 810	6.76	3.61
Toyota	18 888	4.02	19 222	4.51	1.77
Hyundai	17 039	3.63	16 587	3.89	–2.65
Kia	15 340	3.27	15 706	3.69	2.39
Land Rover	14 629	3.11	14 504	3.40	–0.85
Peugeot	16 130	3.43	12 810	3.01	–20.58
Renault	17 275	3.68	12 378	2.90	–28.35
Mini	13 119	2.79	12 282	2.88	–6.38

(Source: *www.smmt.co.uk*)

(a) Write down the market share (%) for Vauxhall in September 2016

.....%

(1)

(b) Compare the Peugeot sales for September 2017 with the Peugeot sales for September 2016

.....

(1)

(c) Which make of car had the largest percentage increase in sales between September 2016 and September 2017?

.....

(1)

(d) How many of these 14 top selling makes of car had fewer sales in September 2017 than in September 2016?

.....

(1)

(Total for Question 3 is 4 marks)

4 Jon found the following information about the average price of a cinema ticket in the UK.

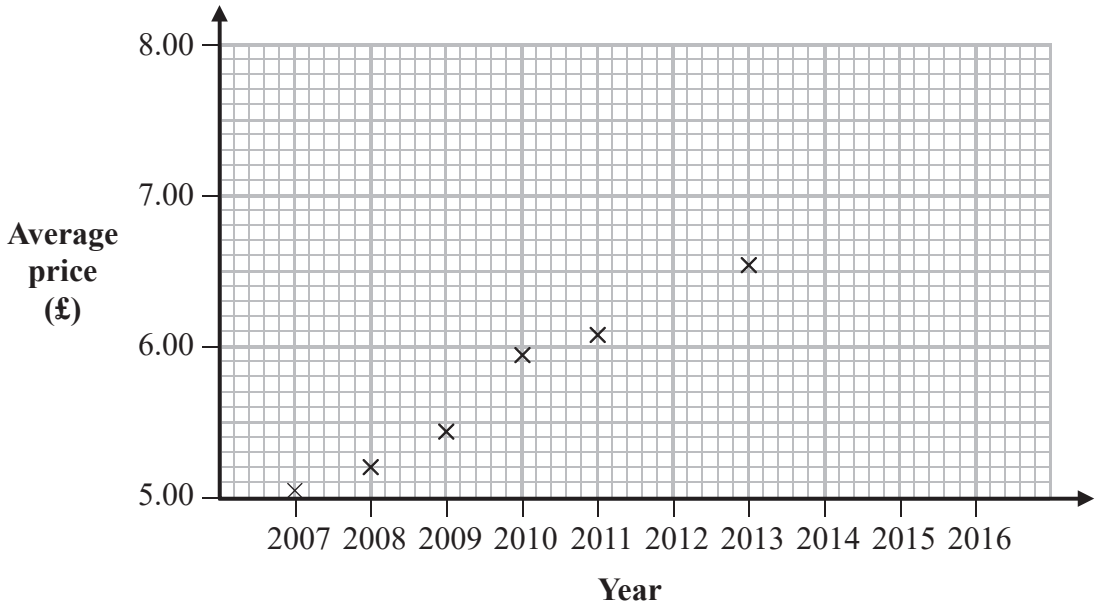
Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Average price (£)	5.05	5.20	5.44	5.95	6.06		6.53	6.72	7.21	7.41

(Source: *UK Cinema Association*)

He did not find the average price for 2012

Jon's first six average prices have been plotted on the grid below.

(a) Plot the average price for each of 2014, 2015 and 2016



(2)

(b) (i) On the grid, draw a trend line for Jon's data.

(1)

(ii) Describe the trend in the average price of cinema tickets in the UK from 2007 to 2016

.....

(1)

Jon uses statistical software to plot a trend line and find its gradient.
The gradient is 0.27

(c) Interpret this gradient.

.....

.....

(1)

Zoe says that the scale used on the Average price axis could make the graph misleading.

(d) Explain whether or not Zoe is correct.

.....

.....

.....

.....

(2)

Barry wants to use a trend line for Jon's data in order to find an estimate of the average price of a cinema ticket in 2012 **and** in 2020

(e) Explain whether each of these is a sensible thing to do.
Do **not** work out these estimates.

.....

.....

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.....

.....

(3)

(Total for Question 4 is 10 marks)

5 A supermarket manager recorded the total number of each type of bank note in the tills when the supermarket closed one Saturday. Here are his results.

Bank note	£5	£10	£20	£50	Total
Number in tills	75	111	96	18	300

One of the bank notes is selected at random.

(a) Find the probability that the value of the bank note is less than £20

.....

(2)

The manager uses his data to predict the proportion of each type of bank note in use in the UK.

Bank note	£5	£10	£20	£50
Predicted proportion	25%	37%	32%	6%

(b) Explain how the manager could improve his predictions.

.....

.....

(1)

The table below shows the true proportion of each type of bank note in use in the UK in 2017

Bank note	£5	£10	£20	£50
True proportion	10%	22%	59%	9%

(Source: *Bank of England*)

(c) For £5 bank notes, compare the true proportion in use in the UK in 2017 with the manager's predicted proportion.
You must suggest a possible reason for any difference.

.....

.....

.....

.....

.....

(2)

(Total for Question 5 is 5 marks)

6 The table shows information about the time taken, in minutes, by each of the Wimbledon men's singles final matches for the 30 years from 1985

Time taken (t minutes)	Frequency	Cumulative frequency
$80 \leqslant t < 120$	7	7
$120 \leqslant t < 160$	7	14
$160 \leqslant t < 200$	11	25
$200 \leqslant t < 240$	3	28
$240 \leqslant t < 280$	1	29
$280 \leqslant t < 320$	1	30

(Source: *Wimbledon.com*)

(a) Explain why the class interval which contains the median time taken is $160 \leqslant t < 200$

.....

.....

(1)

(b) Use linear interpolation to work out an estimate for the median time taken.

..... minutes

(2)

For the 30 years before 1985, the median time taken by the Wimbledon men's singles tennis final matches was 110 minutes.

(c) Compare the median time taken in the 30 years before 1985 with the median time taken in the 30 years from 1985

Interpret your comparison.

.....

.....

.....

(2)

Sue thinks it would be better to use the **mean** for the average of the time taken by these matches.

(d) Suggest a reason why Sue is **not** correct.

.....

.....

(1)

(Total for Question 6 is 6 marks)

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7 Paula organised a fund raising charity run at her school.

Here is part of the spreadsheet that she used to record information about each student who took part.

School Year	Age	Gender	Amount raised
9	13 years 10 months	F	£17
7	11 years 8 month	F	850
7	12 years 25 days	M	£4 and 80 pence
11	16.5 years	F	£15.50
8	12 years 9 months	M	£10

(a) Circle the variable from the list below that has qualitative data.

School Year Age Gender Amount raised

(1)

(b) Give **two** reasons why the data in the spreadsheet needs to be cleaned before it can be processed.

.....

.....

.....

.....

.....

(2)

(c) Explain whether or not using a spreadsheet to process the information is appropriate.

.....

.....

(1)

A total of £252 was raised by the 24 students in Year 9 who took part in the run.

(d) Show that the mean amount raised by these Year 9 students is £10.50

(1)

Paula wants to display information about the amount raised by each year group.

She plans to use a poster to be seen by visitors to the school.

(e) Circle the type of diagram from the list below that would be best to use for this target audience.

Box plot Cumulative frequency chart Pie chart Scatter diagram

(1)

(Total for Question 7 is 6 marks)

8 Mayokun measured and recorded the height, to the nearest cm, of each of the first 20 female students and of each of the first 20 male students to arrive at his college one morning.

He used statistical software to produce these diagrams and these summary statistics to help him compare the distributions.

Female students

13	4
14	2 7 7
15	1 1 2 6 9 9
16	3 5 7 7 9 9
17	1 4 8
18	4

Male students

14	6
15	4 4 4 6 6 7 8 9
16	2 4 4 5 8
17	2 2 7
18	2 5
19	1

Key:

13 | 4 represents 134 cm

	Median	Mean	Range	IQR
Females	161 cm	160 cm	50 cm	18 cm
Males	163 cm	165 cm	45 cm	16 cm

Mayokun chose to use stem and leaf diagrams rather than histograms.

(a) Give one advantage of using stem and leaf diagrams rather than histograms for Mayokun's data.

.....

.....

(1)

Before collecting his data, Mayokun wrote down two hypotheses.

1. Males are taller than females.
2. The heights of males vary more than the heights of females.

(b) Using appropriate results from Mayokun's survey, discuss any conclusions that he might have made about his hypotheses.

You should comment on the reliability of the conclusions.

(6)

(Total for Question 8 is 7 marks)

9 Katrina travels to work by train or by bus or by car.

The table gives some information about her 200 journeys to work last year.

Travel by	Number of journeys	Number of times late for work
Train	120	27
Bus	30	x
Car	50	15

One of the days that Katrina travelled to work last year is picked at random.

(a) Find the probability that she travelled by train and was late for work on that day.

.....

(1)

The absolute risk of Katrina arriving late for work last year when travelling by bus was 0.6

(b) Show why the value of x in the table is 18

(1)

(c) (i) Show that the relative risk of Katrina being late for work last year when she travelled by car compared with when she travelled by bus is 0.5

(2)

(ii) Interpret this relative risk.

.....

.....

(1)

(Total for Question 9 is 5 marks)

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10 At a university, 70% of students are undergraduates and 30% of students are postgraduates.

Amy and Robert want to do a survey.

Amy decides to use simple random sampling to collect a sample of 100 students.

She uses the university database as a sample frame and she numbers each student on the database.
She then generates exactly 100 random numbers and uses these random numbers to select her sample.

(a) Give **two** reasons why Amy's method may **not** produce a sample of 100 students.

.....

.....

.....

.....

(2)

Robert decides to use quota sampling to collect a sample of 100 students.
He plans to stand outside the main building until he has interviewed 70 undergraduates and 30 postgraduates.

(b) Give **two** advantages of using quota sampling.

.....

.....

.....

.....

(2)

(c) Explain why this quota sample is **not** a random sample.

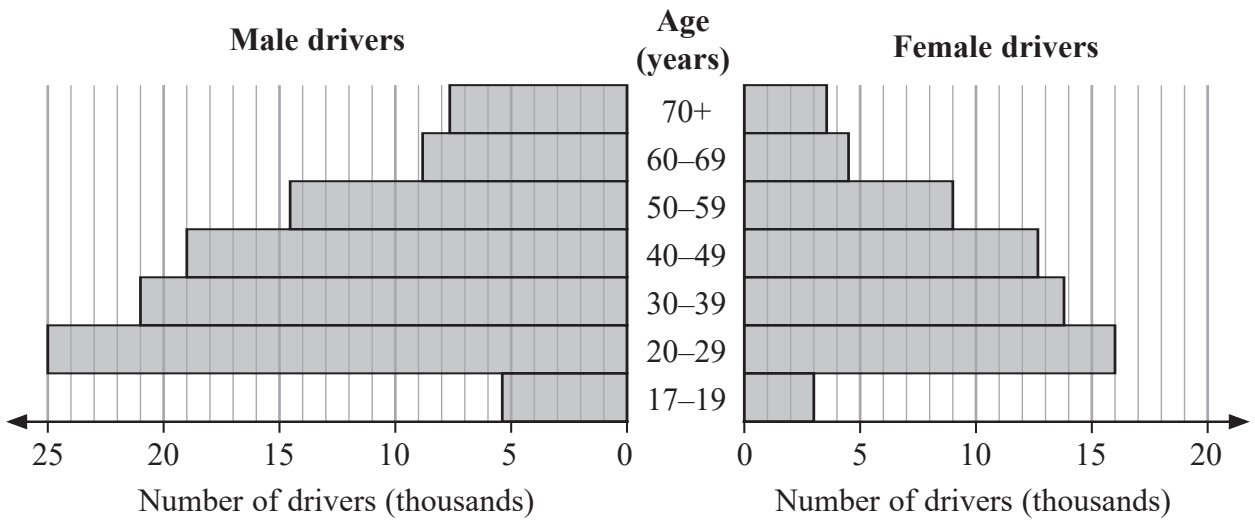
.....

.....

(1)

(Total for Question 10 is 5 marks)

11 The population pyramid shows information about the numbers (in thousands) of drivers of each gender who made car insurance claims in the UK in 2015



(Source: *Department for Transport*)

(a) How many female drivers aged 50–59 in the UK in 2015 made car insurance claims?

..... thousand

(1)

The population pyramid shows that the age group which has the fewest number of drivers who made car insurance claims is the 17–19 age group.

(b) Suggest a reason why this should be so.

.....

.....

(1)

In 2014, the number of male drivers aged 20–49 in the UK who made car insurance claims was 66 700

(c) Compare the number of male drivers aged 20–49 in the UK who made car insurance claims in 2014 with the number of male drivers aged 20–49 in the UK who made car insurance claims in 2015
You must show your working.

.....

.....

(3)

The SafeDrive insurance company charges young male drivers more for car insurance than it charges all other drivers.

(d) Explain **two** features of the population pyramid which SafeDrive might use as its justification for doing this.

.....

.....

.....

.....

(2)

Jeremy says,

"The population pyramid shows that the total number of male drivers in the UK in 2015 is greater than the total number of female drivers in the UK in 2015"

(e) Explain whether or not Jeremy's conclusion is appropriate.

.....

.....

(1)

Vicki says,

"In the UK in 2019, there will be more male drivers who make car insurance claims than female drivers who make car insurance claims"

(f) Explain whether or not the information in the population pyramid can be used to support Vicki's statement.

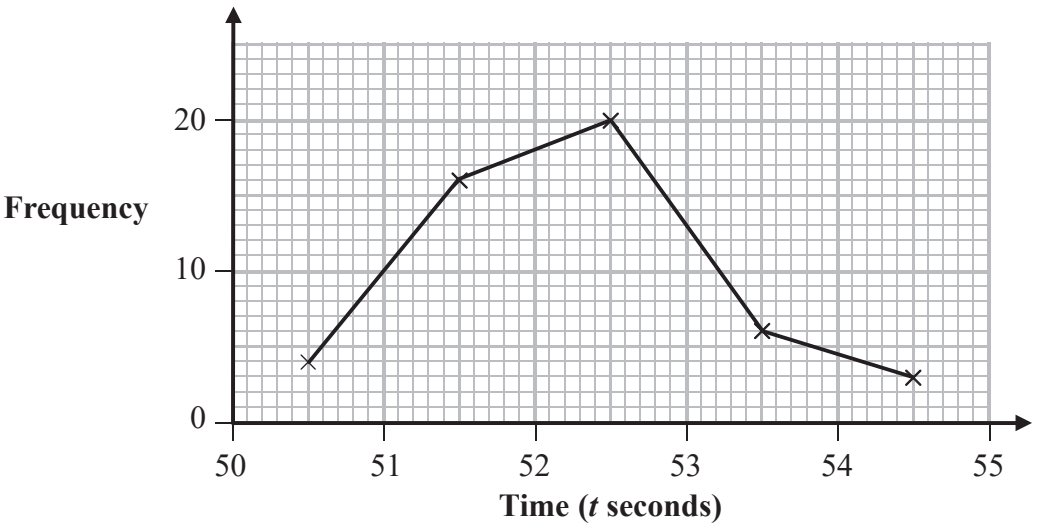
.....

.....

(1)

(Total for Question 11 is 9 marks)

12 The frequency polygon shows information about the times taken by 49 athletes to run 400 metres at the 2017 World Championships.



(Source: *www.iaaf.org*)

(a) Use the information in the frequency polygon to complete the table by writing in the missing times.

Time (t seconds)	Frequency
..... $< t \leqslant$	6

(1)

None of the athletes ran 400 metres in exactly 53 seconds.

(b) Find the number of athletes who ran 400 metres in less than 53 seconds.

.....

(2)

(c) Calculate an estimate for the mean time of the 49 athletes.

..... seconds

(3)

(Total for Question 12 is 6 marks)

13 A food critic was asked to compare six mince pies (labelled A to F) and to rank them in order of quality.

Jacques wants to see if the price of a mince pie depends on its quality.

The tables show information about these six mince pies.

Quality rank	Mince pie
1 (highest quality)	B
2	A
3	C
4	F
5	D
6 (lowest quality)	E

Price rank	Mince pie
1 (highest price)	C
2	B
3	A
4	F
5	E
6 (lowest price)	D

Jacques calculates Spearman's rank correlation coefficient for the quality ranks and the price ranks.

(a) Explain whether or not this is a sensible statistic for Jacques to calculate.

.....

.....

(2)

The value of Spearman's rank correlation coefficient calculated by Jacques is 0.77

(b) Based on this value, write down a conclusion that Jacques could reach.
You must justify your answer.

.....

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(2)

(Total for Question 13 is 4 marks)

TOTAL FOR PAPER IS 80 MARKS

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