



General Certificate of Secondary Education

Centre Number

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Candidate Number

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## Statistics

Unit 2  
Foundation Tier



**MV18**

[GST21]  
Assessment

### Time

Assessment Level of Control    Tick the relevant box (✓)

Controlled Conditions	
Other	

1 hour 30 minutes, plus your additional time allowance.

### Instructions to Candidates

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

Write your answers in the spaces provided in this question paper.  
Answer **all nine** questions.

Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.  
You **may** use a calculator for this paper.

### Information for Candidates

The total mark for this paper is 80.

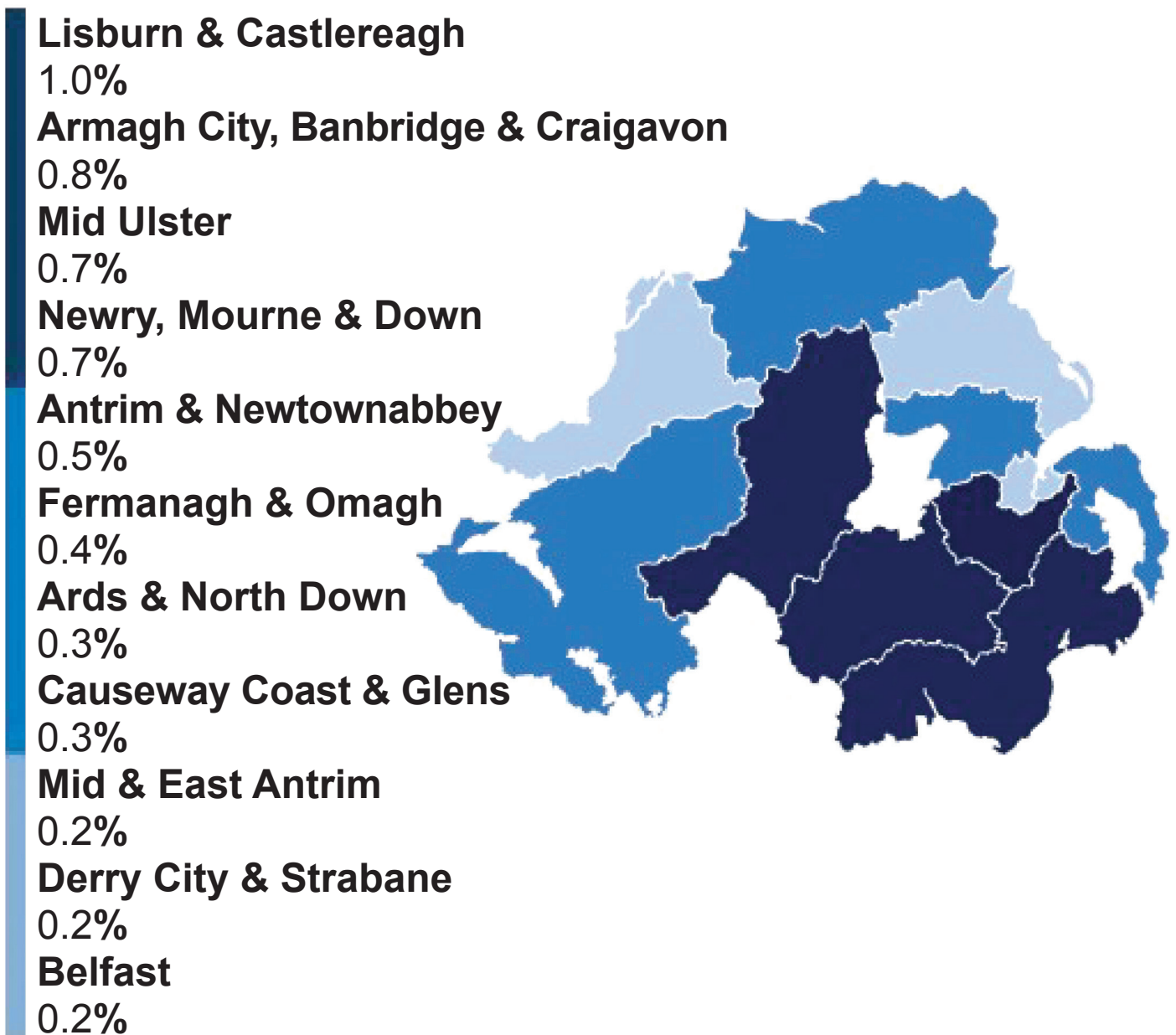
Figures in brackets printed at the end of each question indicate the marks awarded to each question or part question.

You should have a calculator, ruler, compasses and protractor.  
There is no formula sheet for this examination.

Answer **all** questions

- 1 The chart below shows the change in the population of Northern Ireland by Local Government District between mid-2016 and mid-2017

**Population change by Local Government District  
(mid-2016 to mid-2017)**



(a) What is the name of this type of chart? [1 mark]

Choropleth map

Compound bar chart

**(b)** What was the percentage change in the population of Mid Ulster between mid-2016 and mid-2017?  
[1 mark]

Answer \_\_\_\_\_ %

**(c)** In which Local Government District did the population change by the largest percentage? [1 mark]

\_\_\_\_\_

**(d)** Did the population of Belfast change by the same number of people as the population of Mid & East Antrim? [2 marks]

Explain your answer.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

This chart appeared on an Infographic.

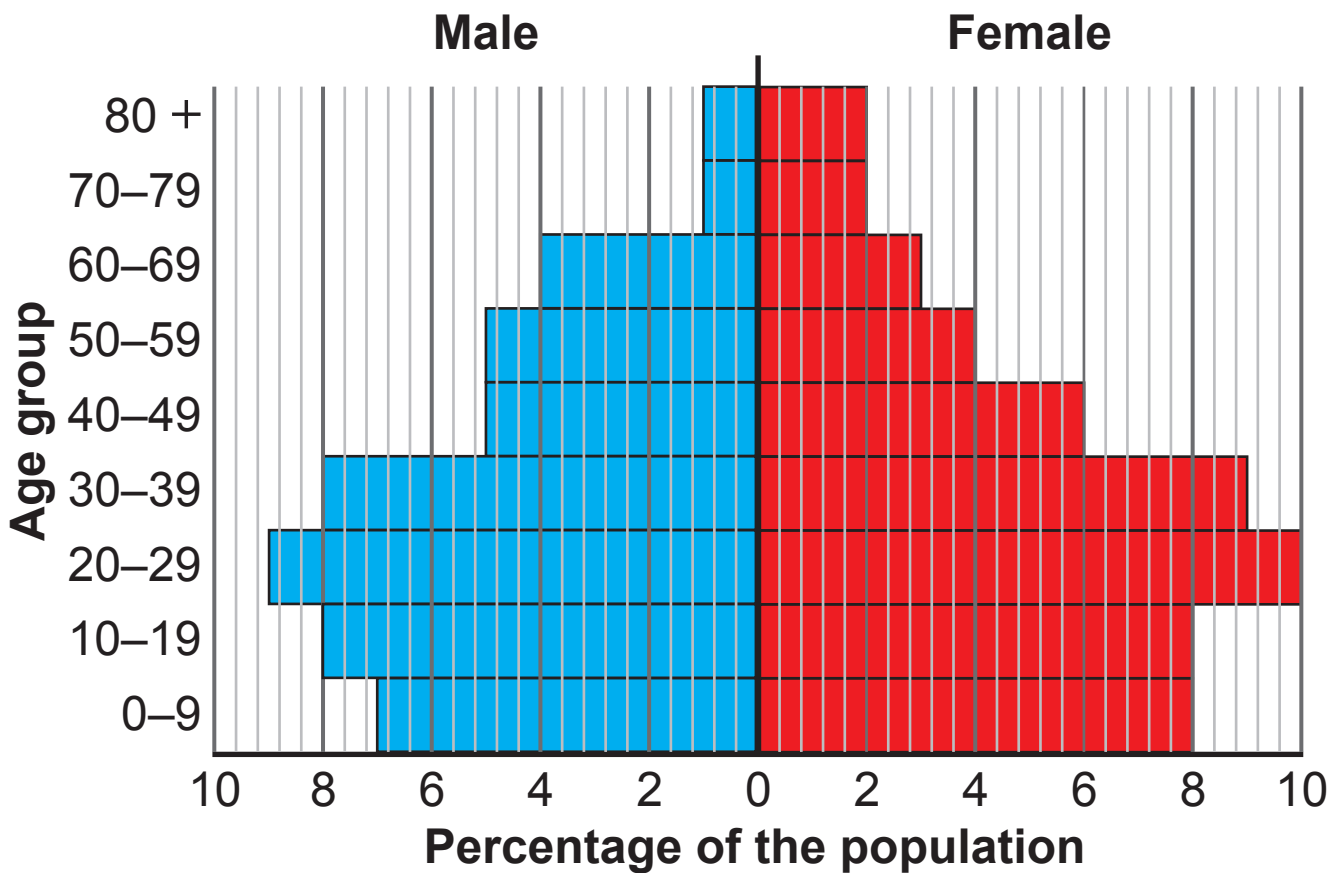
(e) Suggest two improvements to this chart, giving a reason for each one. [2 marks for each]

1. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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**(Questions continue overleaf)**

- 2 The population pyramid shows the percentages of the male and female population in each age group in a large town.



- (a) What percentage of males in the town have ages between 20 and 29? [1 mark]

Answer \_\_\_\_\_ %

- (b) In which age group is the percentage of males and females the same? [1 mark]

Answer \_\_\_\_\_

Jonathan says, “The population pyramid shows there are more females than males living in the town.”

**(c) (i)** Is Jonathan correct? [1 mark]

**Yes**

**No**

**Cannot say**

**(ii)** Explain your answer. [2 marks]

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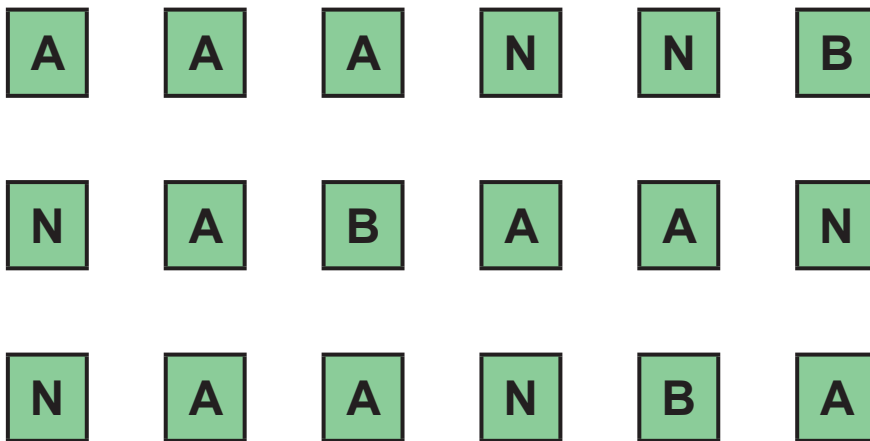
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3 A box contains six cards with letters written on them.

The cards spell out a word.

In a game, players try to guess the word by picking out a card, noting the letter and placing the card back in the box.

After 18 goes, Sean has noted the following letters.



(a) Use this table to summarise Sean's results.

[3 marks]

Letter	Frequency	Fraction of cards
A		
B		
N		



Sean says, "The cards in the box spell the word BANANA."

**(b)** Do you think Sean is correct?

Give a reason for your answer. [2 marks]

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- 4 The manager of a shoe shop wishes to make better decisions about the types of shoe she orders for her shop.

She records the shoe sizes of a sample of 20 boys and 20 girls who visit her shop.

The results are given below.

(boy, 3) (boy, 4) (girl, 3) (girl, 4) (boy, 2) (boy, 4) (girl, 3) (girl, 4)  
(girl, 3) (boy, 4) (girl, 4) (boy, 3) (girl, 4) (boy, 3) (boy, 5) (boy, 4)  
(girl, 4) (boy, 4) (girl, 3) (boy, 4) (boy, 5) (boy, 4) (girl, 4) (boy, 2)  
(boy, 5) (girl, 3) (boy, 2) (girl, 3) (girl, 2) (boy, 5) (boy, 4) (girl, 3)  
(girl, 4) (girl, 3) (girl, 5) (boy, 3) (boy, 3) (girl, 3) (girl, 3) (girl, 2)

- (a) Tick one box in each row to identify the type of variable.  
[2 marks]

	<b>Categorical</b>	<b>Continuous</b>	<b>Discrete</b>
<b>Shoe size</b>			
<b>Gender</b>			

- (b) Has the manager collected primary data or secondary data? [1 mark]

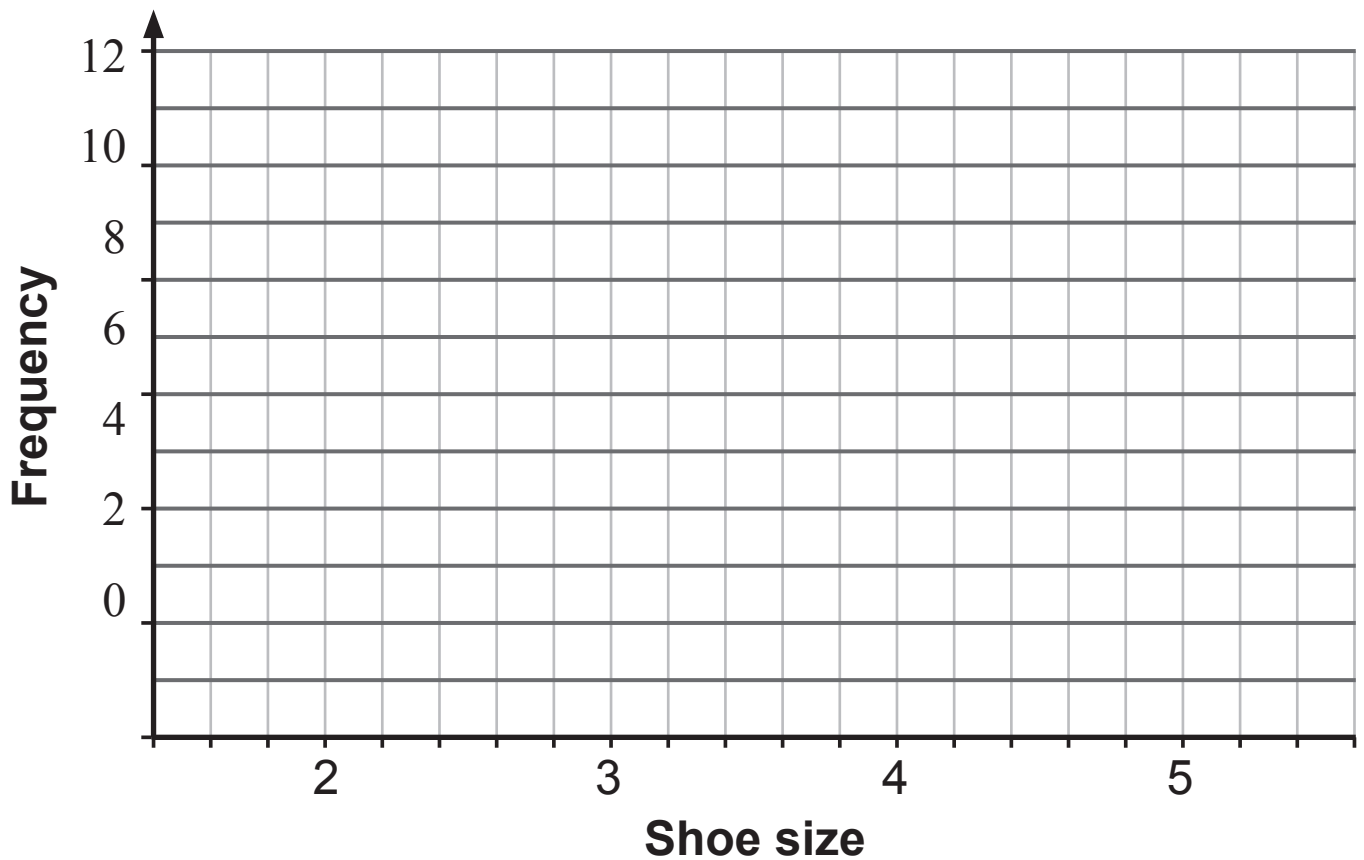
**Primary data**

**Secondary data**

(c) Complete the Tally and Frequency columns in the table below. [4 marks]

	Boys		Girls	
Shoe size	Tally	Frequency	Tally	Frequency
2				
3				
4				
5				

(d) On the grid below, draw a dual bar chart to represent the data collected by the manager. [4 marks]



Key:  Boys  Girls

- 5 Anna records the amount of money she spends on lunch over 10 days.

Her results are as follows.

£3.95

£3.50

£2.85

£2.40

£3.10

£2.75

£3.30

£3.70

£3.00

£3.75

- (a) Find the median amount of money spent by Anna over the 10 days. [3 marks]

Answer £ \_\_\_\_\_

**(b)** Why is it not possible to find the modal amount of money spent by Anna? [1 mark]

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**(c)** Calculate the range of the amounts of money spent by Anna. [2 marks]

Answer £ \_\_\_\_\_

Anna later realised that she had spent £2.50 and not £2.40 on one of the days.

She corrects this value and calculates the median and range again.

**(d)** How will this affect the value of

**(i)** the median; [1 mark]

**Increase**

**Decrease**

**No change**

**(ii)** the range? [1 mark]

**Increase**

**Decrease**

**No change**

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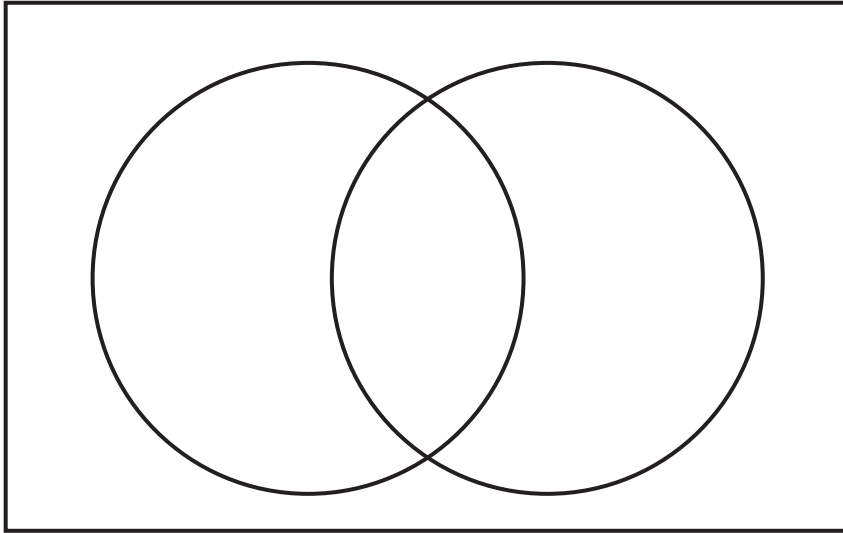
- 6 Conor carried out a survey in his class about the types of chocolate his friends like.

Here is Conor's data collection sheet.

<b>Pupil</b>	<b>Do you like milk chocolate?</b>	<b>Do you like dark chocolate?</b>
1	Yes	Yes
2	Yes	Yes
3	Yes	Yes
4	Yes	Yes
5	Yes	No
6	Yes	No
7	No	No
8	No	No
9	Yes	No
10	Yes	Yes
11	Yes	Yes
12	Yes	No
13	Yes	Yes
14	Yes	Yes
15	Yes	Yes
16	Yes	No
17	No	No
18	Yes	Yes
19	Yes	Yes
20	Yes	Yes
21	No	Yes
22	Yes	Yes
23	Yes	Yes
24	Yes	Yes
25	No	Yes
26	Yes	Yes
27	Yes	Yes
28	Yes	Yes
29	Yes	Yes
30	No	No



- (a)** Show Conor's results in the Venn diagram below.  
[4 marks]



Conor chooses one pupil from his class at random.

- (b)** Find the probability that this pupil likes

- (i)** both milk chocolate and dark chocolate; [2 marks]

Answer \_\_\_\_\_

- (ii)** either milk chocolate or dark chocolate, but not both.  
[3 marks]

Answer \_\_\_\_\_

7 Alex is the manager of a doctors' surgery.

He is concerned about the number of missed appointments.

Alex recorded the number of missed appointments each month for 20 months.

The results are given below.

**31**

**4**

**19**

**0**

**5**

**25**

**10**

**2**

**16**

**24**

**17**

**22**

**173**

**21**

**13**

**20**

**18**

**3**

**11**

**26**

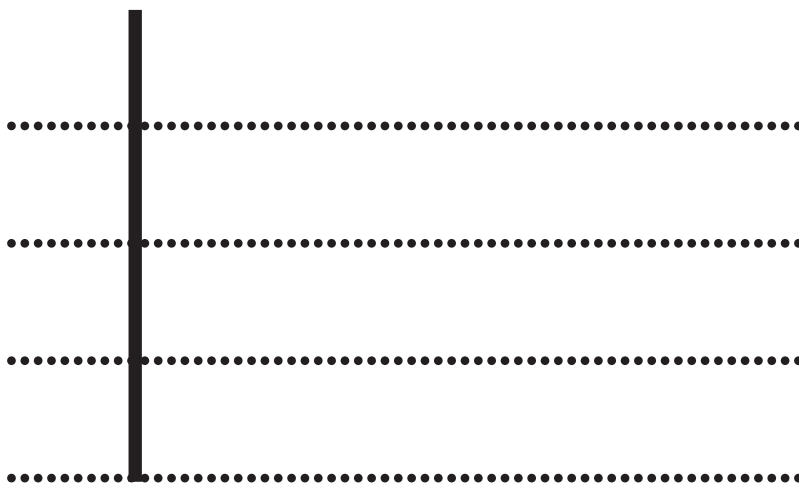
One of the results is an outlier.

**(a)** Which one of the results is this? [1 mark]

Answer \_\_\_\_\_

The outlier is removed.

**(b)** With the outlier removed, draw a stem and leaf diagram to illustrate the data. [3 marks]



**(c)** For the data in the stem and leaf diagram,

- (i)** find the median number of missed appointments;  
[1 mark]

Answer \_\_\_\_\_

- (ii)** work out the range of the number of missed appointments. [2 marks]

Answer \_\_\_\_\_

Alex decides to allow patients to book and cancel their appointments using an app.

After 6 months, he found the median number of missed appointments to be 10

**(d)** Do you think that allowing patients to cancel their appointments using the app has been effective?  
Explain your answer. [2 marks]

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After some time, Alex carried out a survey about the app with patients who came to the surgery.

One of the questions in the questionnaire was:

**How many times have you used our new app?**

**1–2**           

**3–4**           

**4–5**           

**More than 5**

**(e)** Write down two problems with the response section.  
[1 mark for each]

1. \_\_\_\_\_  
\_\_\_\_\_

2. \_\_\_\_\_  
\_\_\_\_\_

**(f)** Suggest one improvement Alex could make to his investigation. [1 mark]

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**8** Maria is investigating how the age and gender distribution of the population of Northern Ireland has changed between June 2008 and June 2018

She intends to use the statistical enquiry cycle to carry out her investigation.

**(a)** Write down a suitable question which Maria could use for her investigation. [1 mark]

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**(b)** What data would Maria need to collect? [3 marks]

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**(c)** Suggest a suitable source for Maria's data. [1 mark]

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**(d)** How could Maria present her results in diagrammatic form? [2 marks]

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(e) Suggest a suitable calculation which Maria could use and how she could interpret the result. [3 marks]

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9 The table below shows the annual population estimates by age group in Northern Ireland between mid-2001 and mid-2017

<b>Annual population estimates by broad age groups, Northern Ireland (mid-2001 to mid-2017)</b>													
<b>Mid- Year Ending</b>	<b>Age groups</b>						<b>As a proportion of all ages</b>						
	<b>All ages</b>	<b>0-15</b>	<b>16-64</b>	<b>65+</b>	<b>85+</b>	<b>0-15</b>	<b>16-64</b>	<b>65+</b>	<b>85+</b>	<b>0-15</b>	<b>16-64</b>	<b>85+</b>	
2001	1688800	397500	1067200	224100	23500	23.5	63.2	13.3	1.4	23.5	63.2	13.3	1.4
2002	1697500	391700	1079000	226800	23700	23.1	63.6	13.4	1.4	23.1	63.6	13.4	1.4
2003	1704900	385900	1089700	229400	23800	22.6	63.9	13.5	1.4	22.6	63.9	13.5	1.4
2004	1714000	381200	1100600	232200	24400	22.2	64.2	13.5	1.4	22.2	64.2	13.5	1.4
2005	1727700	378800	1114100	234900	25900	21.9	64.5	13.6	1.5	21.9	64.5	13.6	1.5
2006	1743100	377100	1127900	238100	27000	21.6	64.7	13.7	1.6	21.6	64.7	13.7	1.6
2007	1761700	377100	1142700	241900	27900	21.4	64.9	13.7	1.6	21.4	64.9	13.7	1.6
2008	1779200	378500	1153200	247500	28900	21.3	64.8	13.9	1.6	21.3	64.8	13.9	1.6
2009	1793300	379500	1160400	253400	29700	21.2	64.7	14.1	1.7	21.2	64.7	14.1	1.7
2010	1804800	380000	1165200	259600	30800	21.1	64.6	14.4	1.7	21.1	64.6	14.4	1.7
2011	1814300	380800	1167800	265800	31800	21.0	64.4	14.6	1.8	21.0	64.4	14.6	1.8
2012	1823600	382100	1168700	272800	32700	21.0	64.1	15.0	1.8	21.0	64.1	15.0	1.8
2013	1829700	382600	1168000	279100	33300	20.9	63.8	15.3	1.8	20.9	63.8	15.3	1.8
2014	1840500	383800	1170800	285900	34400	20.9	63.6	15.5	1.9	20.9	63.6	15.5	1.9
2015	1851600	385200	1174600	291800	35500	20.8	63.4	15.8	1.9	20.8	63.4	15.8	1.9
2016	1862100	388000	1176400	297800	36500	20.8	63.2	16.0	2.0	20.8	63.2	16.0	2.0
2017	1870800	390700	1177200	303000	37200	20.9	62.9	16.2	2.0	20.9	62.9	16.2	2.0

**(a)** What was the estimated total population in mid-2004?  
[1 mark]

Answer \_\_\_\_\_ million people

**(b)** Does the information in the table suggest that the population is continuing to age? Explain your answer.  
[2 marks]

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Teresa thinks that the totals for all ages in the table have been calculated incorrectly. She says, "In 2001 the total population has been stated as 1 688 800 but the age group totals add up to 1 712 300."

**(c)** Explain whether or not Teresa is correct. [3 marks]

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Teresa wishes to analyse the trend in estimated total population in Northern Ireland between mid-2001 and mid-2017

(d) Write down the name of one diagram Teresa could use to illustrate this trend. [1 mark]

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Teresa decides to use simple index numbers to analyse the trend in estimated total population in Northern Ireland between mid-2001 and mid-2017

She uses mid-2001 as the base period.

(e) Write down the index number for mid-2001 [1 mark]

Answer \_\_\_\_\_

Teresa calculates the simple index number for mid-2017 to be 110.8

(f) Use this information to complete the sentence below. [3 marks]

The population in \_\_\_\_\_

is \_\_\_\_\_ % more than it was in

\_\_\_\_\_ .

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**This is the end of the question paper**

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## Sources

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Question Number	Marks
1	
2	
3	
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5	
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9	
<b>Total Marks</b>	

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