

**Paper Reference 1ST0/2F**  
**Pearson Edexcel**  
**Level 1/Level 2 GCSE (9–1)**

Total Marks

**Statistics**  
**PAPER 2**  
**Foundation Tier**  
**(Calculator)**

**Monday 19 June 2023 – Afternoon**

**Time: 1 hour 30 minutes**

**In the boxes below, write your name,  
centre number and candidate number.**

<b>Surname</b>					
<b>Other names</b>					
<b>Centre Number</b>					
<b>Candidate Number</b>					

**Y72895RA**

**YOU MUST HAVE**

**Ruler, protractor, compasses, writing and drawing equipment, scientific calculator.**

**YOU WILL BE GIVEN**

**Data Booklet**

**Turn over**

# **INSTRUCTIONS**

**Answer ALL questions.**

**Answer the questions in the spaces provided in this Question Paper or on the separate data sheets – 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.**

**Turn over**

## **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.**

**There may be spare copies of some data sheets in case you need them.**

## **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.**

**5**

**Answer ALL questions.**

**Write your answers in the spaces provided.**

**You must write down all the stages in your working.**

**Turn over**

- 1. Look at the diagram for Question 1 in the Data Booklet.**

**It is an incomplete comparative bar chart showing the total number of medals won by three of the countries that took part in the 2014 and 2018 Winter Olympics.**

**The total number of medals won by Sweden in the 2018 Winter Olympics was 14**

- (a) Complete the comparative bar chart in the Data Booklet for Sweden.**

**(1 mark)**

**(continued on the next page)**

**Turn over**

**1. continued.**

**(b) Work out how many more medals were won by Sweden than Great Britain in the 2014 Winter Olympics.**

**(2 marks)**

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**(continued on the next page)**

**Turn over**

**1. continued.**

- (c) Compare the total number of medals won by Sweden, Great Britain and Switzerland in the 2014 Winter Olympics.**
- (2 marks)**

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**(continued on the next page)**

**Turn over**



**1. continued.**

**Thomas says that the data displayed in the comparative bar chart is quantitative data.**

**(d) Explain what is meant by quantitative data.**  
**(1 mark)**

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**(Total for Question 1 is 6 marks)**

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**Turn over**

- 2. Look at the table for Question 2 in the Data Booklet.**

**Norbert asked each of the students in his class to name their favourite fruit from Apple, Banana, Orange or Pear.**

**The results are shown below.**

<b>Banana</b>	<b>Orange</b>	<b>Apple</b>	<b>Banana</b>
<b>Apple</b>	<b>Apple</b>	<b>Banana</b>	<b>Orange</b>
<b>Apple</b>	<b>Banana</b>	<b>Apple</b>	<b>Apple</b>
<b>Orange</b>	<b>Apple</b>	<b>Pear</b>	<b>Banana</b>
<b>Pear</b>	<b>Pear</b>	<b>Apple</b>	<b>Banana</b>

**(continued on the next page)**

**Turn over**

**2. continued.**

**(a) Fill in the tally chart for the information on the previous page AND complete the frequency column in the table in the Data Booklet.**

**(2 marks)**

**(continued on the next page)**

**Turn over**

**2. continued.**

**(b) How many students are in the class?**

**(1 mark)**

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**(continued on the next page)**

**Turn over**

**2. continued.**

**One of the students is chosen at random.**

**(c) Find the probability that this student's favourite fruit is Orange.**  
**(1 mark)**

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**(continued on the next page)**

**Turn over**

**2. continued.**

**(d) Compare the number of students whose favourite fruit is Apple to the number of students whose favourite fruit is Pear.**

**(1 mark)**

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**(continued on the next page)**

**Turn over**

**2. continued.**

**Norbert decides to find the favourite fruit that is the mode.**

**(e) Explain why the mode is an appropriate average for Norbert to find for this type of data.  
(1 mark)**

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**(continued on the next page)**

**Turn over**

**2. continued.**

**(f) Give one advantage of the tally chart over the raw data.**

**(1 mark)**

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**(continued on the next page)**

**Turn over**



**2. continued.**

**Norbert wants to draw a diagram to represent his results.**

**(continued on the next page)**

**Turn over**

**2. continued.**

**(g) Circle the type of diagram  
from the list below that is most  
suitable for him to draw.**

**(1 mark)**

**Scatter diagram**

**Bar chart**

**Line graph**

**Time series**

**(Total for Question 2 is 8 marks)**

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**Turn over**

- 3. Look at the diagram for Question 3 in the Data Booklet.**

**Keshav has a spinner with equal sections numbered 1, 2, 3 and 4**

**(continued on the next page)**

**3. continued.**

**To investigate whether or not the spinner is biased towards the number 1 he spins the spinner 40 times.**

**(a) Explain what is meant by ‘biased towards the number 1’  
(1 mark)**

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**(continued on the next page)**

**Turn over**

**3. continued.**

**Here is information about Keshav's results.**

<b>Number</b>	<b>Frequency</b>
<b>1</b>	<b>24</b>
<b>2</b>	<b>6</b>
<b>3</b>	<b>5</b>
<b>4</b>	<b>5</b>

**Keshav says the results show that the spinner is biased.**

**(continued on the next page)**

**Turn over**

**3. continued.**

**(b) Discuss whether or not the information in the table on the previous page supports what Keshav says.**

**(2 marks)**

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**(continued on the next page)**

**Turn over**

**3. continued.**

**(c) What could Keshav do to help  
improve the accuracy of his  
investigation?**

**(1 mark)**

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**(Total for Question 3 is 4 marks)**

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**Turn over**

4. Rose is investigating the number of brothers and sisters that students in her secondary school have.

To investigate this she asks  
10 students in Year 8 and  
10 students in Year 11 how many  
brothers and sisters they each have.

- (a) Assess Rose's method for her  
data collection.

(1 mark)

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(continued on the next page)

Turn over



**4. continued.**

**Look at the diagram for  
Question 4(b), 4(c) and 4(d) in the  
Data Booklet.**

**It is a vertical line graph showing the  
data that she collected.**

**(b) How many students have 2 or  
more brothers and sisters?  
(2 marks)**

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**(continued on the next page)**

**Turn over**

**4. continued.**

**(c) Write down the mode.**

**(1 mark)**

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**(continued on the next page)**

**Turn over**

**4. continued.**

**Rose uses her vertical line graph to conclude that no student in her school has 5 or more brothers or sisters.**

**(d) Assess whether or not Rose's conclusion is appropriate.**

**(1 mark)**

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**(Total for Question 4 is 5 marks)**

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**Turn over**

- 5. Look at the table for Question 5 in the Data Booklet.**

**It shows an incomplete two-way table.**

**Linzi is the owner of a coffee shop and makes afternoon teas for customers.**

**The customers have an option of egg or ham sandwiches and an option of plain or fruit scones.**

**The incomplete two-way table in the Data Booklet shows information about the number of afternoon teas she makes one Saturday.**

**(continued on the next page)**

**Turn over**

**5. continued.**

**(a) Complete the two-way table in the Data Booklet.**

**There are three spaces to fill.**

**(2 marks)**

**(continued on the next page)**

**Turn over**

**5. continued.**

**One of the customers is chosen at random.**

**(b) Write down the probability that this customer**

**(i) ordered a plain scone,  
(1 mark)**

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**(continued on the next page)**

**Turn over**

**5. (b) continued.**

**(ii) ordered an egg sandwich  
and a fruit scone,  
(1 mark)**

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**(continued on the next page)**

**Turn over**

5. (b) continued.

(iii) did NOT order a ham  
sandwich.

(2 marks)

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(continued on the next page)

Turn over



**5. continued.**

**Linzi needs to place an order for  
scones for the next Saturday.**

**(continued on the next page)**

**5. continued.**

**(c) Use the information in the table to help her decide if she should order more fruit scones than plain scones.**

**Give a reason for your answer.**

**(2 marks)**

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**(Total for Question 5 is 8 marks)**

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**Turn over**

- 6. Connie is going to write a report on the difference in total rainfall between London and Aberdeen in 2019. She collects secondary data to investigate this.**

**This question is multiple choice.**

**Write the letter of your chosen answer in the box provided on the next page.**

**6. continued.**

**(a) What should Connie include in her report?**

**A source of the data**

**B her telephone number**

**C her age**

**D name of her school**

**Answer**

**(1 mark)**

**(continued on the next page)**

**Turn over**

**6. continued.**

**(b) Describe one way that she could obtain this secondary data.**

**(1 mark)**

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**(continued on the next page)**

**Turn over**

**6. continued.**

**Look at the table for Question 6(c) in the Data Booklet.**

**It shows the total rainfall, in cm, for each month in 2019 in London.**

**The mean monthly rainfall in Aberdeen in 2019 is 6.2 cm**

**Connie considers the data in the table and concludes that the mean monthly rainfall for Aberdeen in 2019 is greater than the mean monthly rainfall in London in 2019**

**(continued on the next page)**

**Turn over**

**6. continued.**

**(c) Is Connie correct?**

**You must show how you get your  
answer.**

**(3 marks)**

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**(Total for Question 6 is 5 marks)**

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**Turn over**

- 7. A theme park in Staffordshire has around 30 000 visitors per day.**

**Navine is a manager at the theme park.**

**Navine is investigating what visitors think about the theme park.**

**He is going to do a survey of visitors at the theme park.**

**Navine decides to question  
30 people aged under 18 and  
30 people aged 18 and over  
as they leave the theme park one day.**

**(continued on the next page)**

**Turn over**



**7. continued.**

**He plans to ask them face to face  
what their favourite ride was.**

**(a) Name this sampling method.  
(1 mark)**

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**(continued on the next page)**

**Turn over**

**7. continued.**

**(b) Describe the population for this survey.**

**(1 mark)**

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**(continued on the next page)**

**Turn over**

**7. continued.**

**(c) Assess Navine's plan to get the opinions of the people who have visited the theme park.**

**(3 marks)**

**Answer lines continue on the next page.**

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**Turn over**

**7. (c) continued.**

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**(Total for Question 7 is 5 marks)**

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**Turn over**

**8. A Science teacher wants to know the effects of revision on a student's performance in an exam.**

**She decides to carry out an experimental test on a group of 15 students to find out the effects of any revision.**

**(a) Describe one way the teacher could carry out an experimental test.**

**(2 marks)**

**Answer lines continue on the next page.**

8. (a) continued.

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(continued on the next page)

Turn over

**8. continued.**

**(b) Give one reason why the results of this experimental test could be unreliable.**

**(1 mark)**

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**(Total for Question 8 is 3 marks)**

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**Turn over**

- 9. Look at the diagram for Question 9 in the Data Booklet.**

**It is a graph showing the crude birth rate and crude death rate for Malta from 2000 to 2014**

**Using the information from the graph in the Data Booklet Lottie concludes**

**“The total population of Malta has increased between 2000 and 2014”**

**(continued on the next page)**



**9. continued.**

**(a) Explain how the graph can be used to support Lottie's conclusion.**

**(1 mark)**

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**(continued on the next page)**

**Turn over**

**9. continued.**

**(b) Give one reason why Lottie's conclusion might NOT be correct.**

**(1 mark)**

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**(continued on the next page)**

**Turn over**

9. continued.

In 2015, the population of Malta was  
445 053

In the same year there were 4398  
births in Malta.

(continued on the next page)

**9. continued.**

**(c) Using the formula below, work out the crude birth rate in Malta in 2015**

**Give your answer correct to 1 decimal place.**

**crude birth rate =**

$$\frac{\text{number of births} \times 1000}{\text{total population}}$$

**(2 marks)**

**Answer space continues on the next page.**

**Turn over**

9. (c) continued.

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**(Total for Question 9 is 4 marks)**

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**Turn over**

**10. Sam used the internet to collect the times, in minutes, it took for 50 cyclists to compete in a hill climb competition.**

**He used a group frequency table to record the results he collected.**

**(a) (i) Give one advantage of using grouped data rather than raw data.**

**(1 mark)**

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**(continued on the next page)**

**Turn over**

**10. (a) continued.**

**(ii) Give one disadvantage of  
using grouped data rather  
than raw data.**

**(1 mark)**

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**(continued on the next page)**

**Turn over**

**10. continued.**

**Sam used the grouped frequency table on the next page to show the results for the hill climb.**

**(continued on the next page)**



10. continued.

<b>Time (t minutes)</b>	<b>Frequency</b>
<b><math>11 \leq t &lt; 12</math></b>	<b>2</b>
<b><math>12 \leq t &lt; 13</math></b>	<b>25</b>
<b><math>13 \leq t &lt; 14</math></b>	<b>15</b>
<b><math>14 \leq t &lt; 15</math></b>	<b>4</b>
<b><math>15 \leq t &lt; 16</math></b>	<b>1</b>
<b><math>16 \leq t &lt; 17</math></b>	<b>1</b>
<b><math>17 \leq t &lt; 18</math></b>	<b>1</b>

(continued on the next page)

Turn over

**10. continued.**

**Before Sam collected the data he did not know what the longest time would be.**

**The longest time in the hill climb was 28·3 minutes.**

**(b) Explain why this table cannot be used to show the data for all 50 riders.**

**(1 mark)**

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**(continued on the next page)**

**Turn over**

**10. continued.**

**Look at the diagram for  
Question 10(c) and 10(d) in the  
Data Booklet.**

**It shows the frequency polygon that  
Sam drew for the hill climb results.**

**Sam decided not to include the value  
of  $28.3$  minutes on his frequency  
polygon.**

**(continued on the next page)**

**Turn over**

**10. continued.**

- (c) Suggest a reason why Sam's decision might be appropriate.  
(1 mark)**

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**(continued on the next page)**

**Turn over**

**10. continued.**

**(d) (i) Describe the skew of the distribution.**

**(1 mark)**

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**(ii) Interpret the skew of the distribution in context.**

**(1 mark)**

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**(Total for Question 10 is 6 marks)**

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**Turn over**

- 11. Grace asked a sample of 60 people in her town if they had ever visited France or Spain.**

**17 people visited both France and Spain**

**23 people visited Spain only**

**33 people visited France**

- (a) Draw a Venn diagram in the Data Booklet to represent this information.**

**There is blank space on pages 12 and 19 in the Data Booklet.**

**(5 marks)**

**11. continued.**

**Grace says**

- **more than half of the people in her sample have visited France**
- **therefore more than half of the people in her town have visited France**

**(continued on the next page)**

**Turn over**

**11. continued.**

**(b) Discuss the validity of each of  
Grace's comments.**

**(3 marks)**

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**(Total for Question 11 is 8 marks)**

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**Turn over**



**12. Look at the diagram for Question 12 in the Data Booklet.**

**It is a box plot.**

**Logan is investigating the heights of male adult giraffes and the heights of female adult giraffes.**

**He records the height, in metres, of each of a sample of male adult giraffes and the height, in metres, of each of a sample of female adult giraffes.**

**(continued on the next page)**

**12. continued.**

**He draws the box plot in the  
Data Booklet for the recorded heights  
of the male adult giraffes.**

**The table on the next page gives  
information about the recorded  
heights of the female adult giraffes.**

**(continued on the next page)**

**Turn over**

## 12. continued.

<b>Summary statistic</b>	<b>Height (metres)</b>
<b>Mean</b>	<b>4·8</b>
<b>Median</b>	<b>4·9</b>
<b>Minimum</b>	<b>3·9</b>
<b>Maximum</b>	<b>5·9</b>
<b>Lower quartile</b>	<b>4·2</b>
<b>Upper quartile</b>	<b>5·4</b>

(continued on the next page)

Turn over

**12. continued.**

**Logan makes the following two conclusions.**

- 1. Male adult giraffes are generally taller than female adult giraffes.**
- 2. The heights of the female adult giraffes are more consistent than the heights of the male adult giraffes.**

**(continued on the next page)**

**Turn over**

**12. continued.**

**Assess Logan's two conclusions.**

**You should show clearly the values of any statistics you use in your answer.**

**(5 marks)**

**Answer lines are on the next two pages.**

**Turn over**

**12. continued.**

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**Turn over**

**12. continued.**

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**(Total for Question 12 is 5 marks)**

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**Turn over**

**13. Look at the diagram for Question 13 in the Data Booklet.**

**It is a cumulative frequency step polygon showing information about the number of goals scored in each of 28 matches played by the German women's national football team.**

**(continued on the next page)**



**13. continued.**

- (a) Give a reason why a cumulative frequency step polygon is used to represent this information rather than a cumulative frequency curve.**

**(1 mark)**

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**(continued on the next page)**

**Turn over**

**13. continued.**

**(b) Find the mode of the number of goals scored.**

**(1 mark)**

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**(continued on the next page)**

**Turn over**

**13. continued.**

**(c) Find the number of these  
matches where**

**(i) exactly 6 goals were scored,  
(1 mark)**

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**(continued on the next page)**

**Turn over**

**13. (c) continued.**

**(ii) more than 6 goals were  
scored.**

**(2 marks)**

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**(continued on the next page)**

**Turn over**

**13. continued.**

**In 24 matches fewer than  $n$  goals were scored.**

**(d) Find the value of  $n$   
(1 mark)**

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**(continued on the next page)**

**Turn over**

**13. continued.**

**Klara tries to calculate the  
interquartile range of the number of  
goals scored.**

**She gets an answer of 14**

**(e) Explain how you know that her  
answer is incorrect.**

**(1 mark)**

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**(Total for Question 13 is 7 marks)**

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**Turn over**

**14. Look at the diagram for Question 14 in the Data Booklet.**

**It is a choropleth map representing a park that has been divided into 25 squares of equal area.**

**Arthur has collected data about litter in the park.**

**The number of pieces of litter collected in each square on one Saturday morning is shown.**

**(continued on the next page)**

**Turn over**

**14. continued.**

- (a) Use the information in the choropleth map to calculate an estimate of the total number of pieces of litter that were collected that day.**

**(3 marks)**

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**(continued on the next page)**

**Turn over**



**14. continued.**

**Arthur works in this park.**

**He has been asked to decide where a new bin should be placed in the park to help reduce the amount of litter.**

**He concludes that the new bin should be placed in the corner of the park represented by the bottom right of the choropleth map.**

**(continued on the next page)**

**Turn over**

**14. continued.**

**(b) Assess the validity of Arthur's  
conclusion with reference to the  
choropleth map.**

**(2 marks)**

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**(continued on the next page)**

**Turn over**

**14. continued.**

**Ian suggests that the method Arthur used to collect his data is not suitable to reach a reliable conclusion.**

**(continued on the next page)**

**Turn over**

**14. continued.**

**(c) Assess whether Ian's suggestion  
is correct.**

**Give a reason for your answer.**

**(1 mark)**

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**(Total for Question 14 is 6 marks)**

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**TOTAL FOR PAPER IS 80 MARKS**

**END OF PAPER**

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## **Sources**

### **Question 7**

**(Source: [www.statista.com](http://www.statista.com))**

### **Question 10**

**(Source: [cyclinguphill.com](http://cyclinguphill.com))**