

Tabulation and Representation of data – GCSE Statistics

1. No.5

(a) Grace buys lunch at her favourite sandwich shop each day.

She records the time (in minutes) she has to queue for each of 20 visits.

3	2	4	2	1	0	2	3	1	1
2	0	0	1	1	0	3	1	2	1

Complete the frequency table, including the remaining headings.

[4 marks]

	Tally	
0		
1		
2		
3		
4		

(b) Archie collects similar data for the same sandwich shop for 10 visits.

He recorded these times (in minutes).

3	2	3	0	1	44	2	4	3	0
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Identify a problem with the data.

Suggest how to deal with the problem.

[2 marks]

Problem _____

Suggestion _____

(c) Pavel collects data for the same shop.

He says,

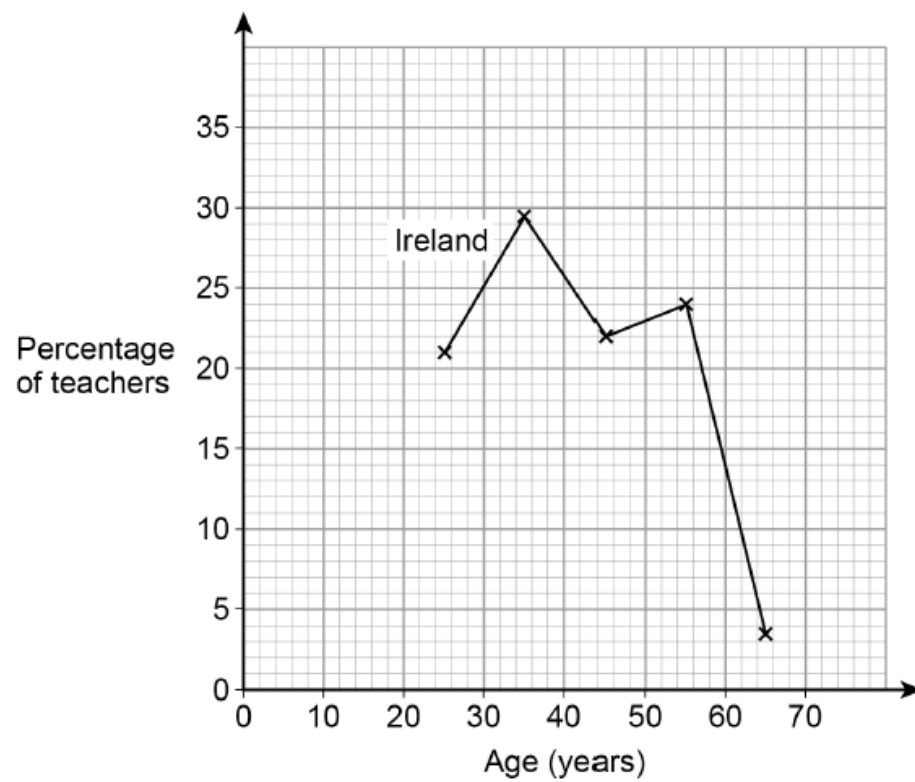
“I’ve decided to group the data in groups of 5 minutes.”

Comment on Pavel’s decision.

[1 mark]

2. No.10

The grid shows a frequency polygon of the percentage of teachers by age in Ireland.



(a) Circle the modal age group for teachers in Ireland.

[1 mark]

20 – 29

30 – 39

40 – 49

50 – 59

60 – 69

- (b) Explain why the point for the first group, 20 – 29, is plotted at 25

[1 mark]

- (c) The table shows the percentage of teachers by age in Norway.

Age (years)	Percentage of teachers
20 – 29	9.2
30 – 39	31.1
40 – 49	19.8
50 – 59	27.9
60 – 69	12.0

Draw a frequency polygon for the Norway data on the same grid on page 12.

[2 marks]

- (d) Compare the modal age group for teachers in the two countries.

[1 mark]

- (e) When comparing the **range** of ages for the two countries which of these is true?

Tick (✓) one box.

[2 marks]

The range is larger in Ireland.

☐

The range is larger in Norway.

☐

It is not possible to tell which range is larger.

☐

The ranges are the same.

☐

Give a reason for your answer.

- (f) Make **one** further comparison between the data for Ireland and Norway.

[1 mark]

3. No.14

A bird charity places nest boxes in three woodlands, Staple Woods, East Valley Woods and Stourness Woods.

The pictogram shows the number of nest boxes it places in each woodland.

Staple Woods	      
East Valley Woods	     
Stourness Woods	   

Key:  represents _____ nest boxes

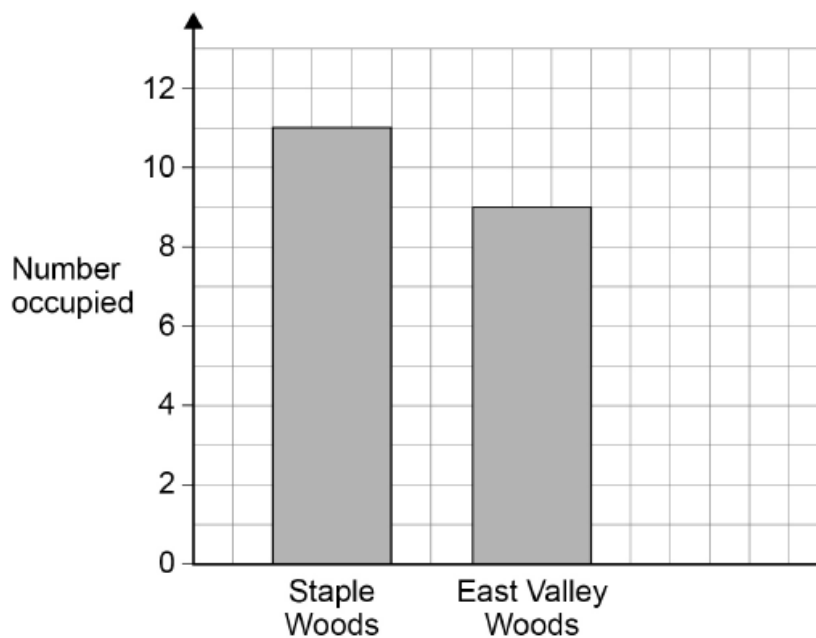
- (a) The charity places 24 more nest boxes in East Valley Woods than it places in Stourness Woods.

Show that  represents 15 nest boxes.

[2 marks]

At the end of the year, the charity checks the nest boxes to see if they have been occupied by birds.

The bar chart shows the number of occupied nest boxes in two of the woodlands.



- (b) Mandy claims that a greater proportion of the nest boxes in Staple Woods were occupied than the boxes in East Valley Woods.

Is she correct?

Tick (✓) one box.

Yes

☐

No

☐

You **must** show your working.

[3 marks]

- (c) The charity finds that exactly 10% of all the nest boxes have been occupied.

Complete the bar chart on the page opposite to show the number of occupied nest boxes in Stourness Woods.

[3 marks]

4. No.6

A bird charity places nest boxes in three woodlands, Staple Woods, East Valley Woods and Stourness Woods.

The pictogram shows the number of nest boxes it places in each woodland.

Staple Woods	
East Valley Woods	
Stourness Woods	

Key:  represents _____ nest boxes

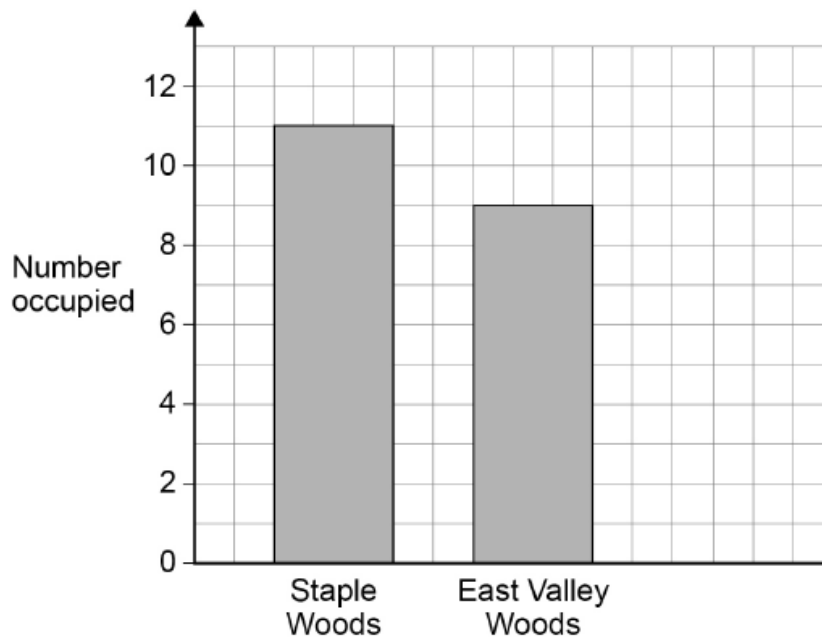
- (a) The charity places 24 more nest boxes in East Valley Woods than it places in Stourness Woods.

Show that  represents 15 nest boxes.

[2 marks]

At the end of the year, the charity checks the nest boxes to see if they have been occupied by birds.

The bar chart shows the number of occupied nest boxes in two of the woodlands.



- (b) Mandy claims that a greater proportion of the nest boxes in Staple Woods were occupied than the boxes in East Valley Woods.

Is she correct?

Tick (✓) one box.

Yes

☐

No

☐

You **must** show your working.

[3 marks]

- (c) The charity finds that exactly 10% of all the nest boxes have been occupied.

Complete the bar chart on the page opposite to show the number of occupied nest boxes in Stourness Woods.

[3 marks]

5. No.15

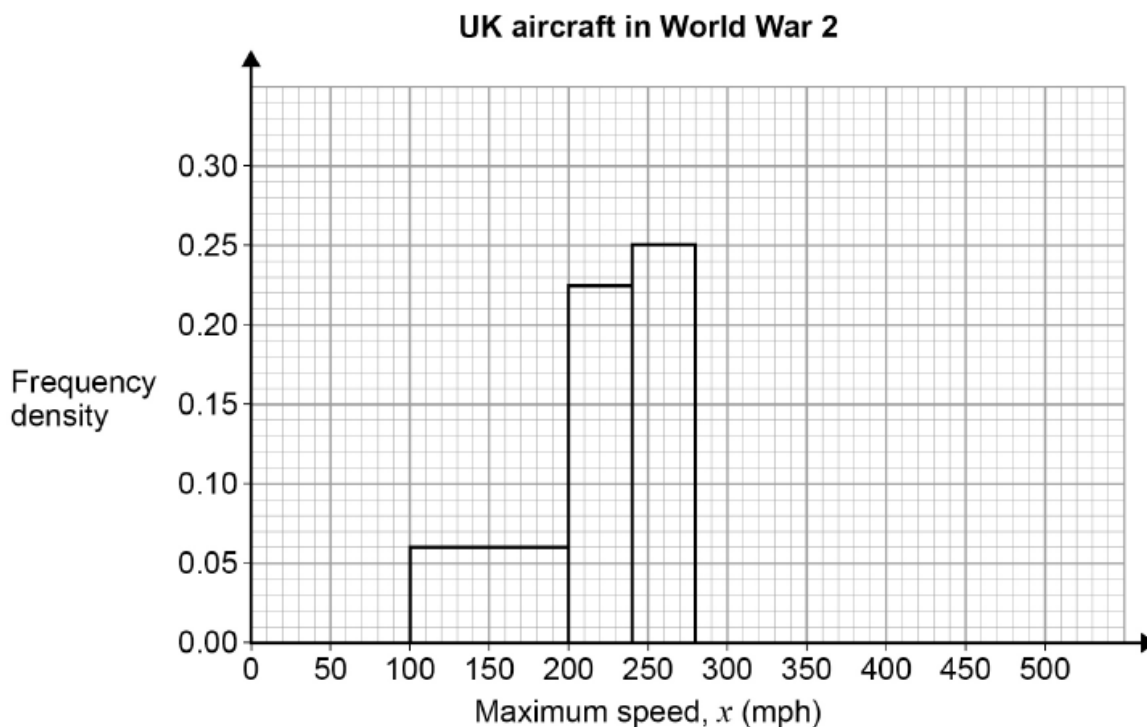
An air museum has aircraft that were used by the UK in the two World Wars.

(a) The table shows the maximum speed (mph) of the museum's aircraft from World War 2

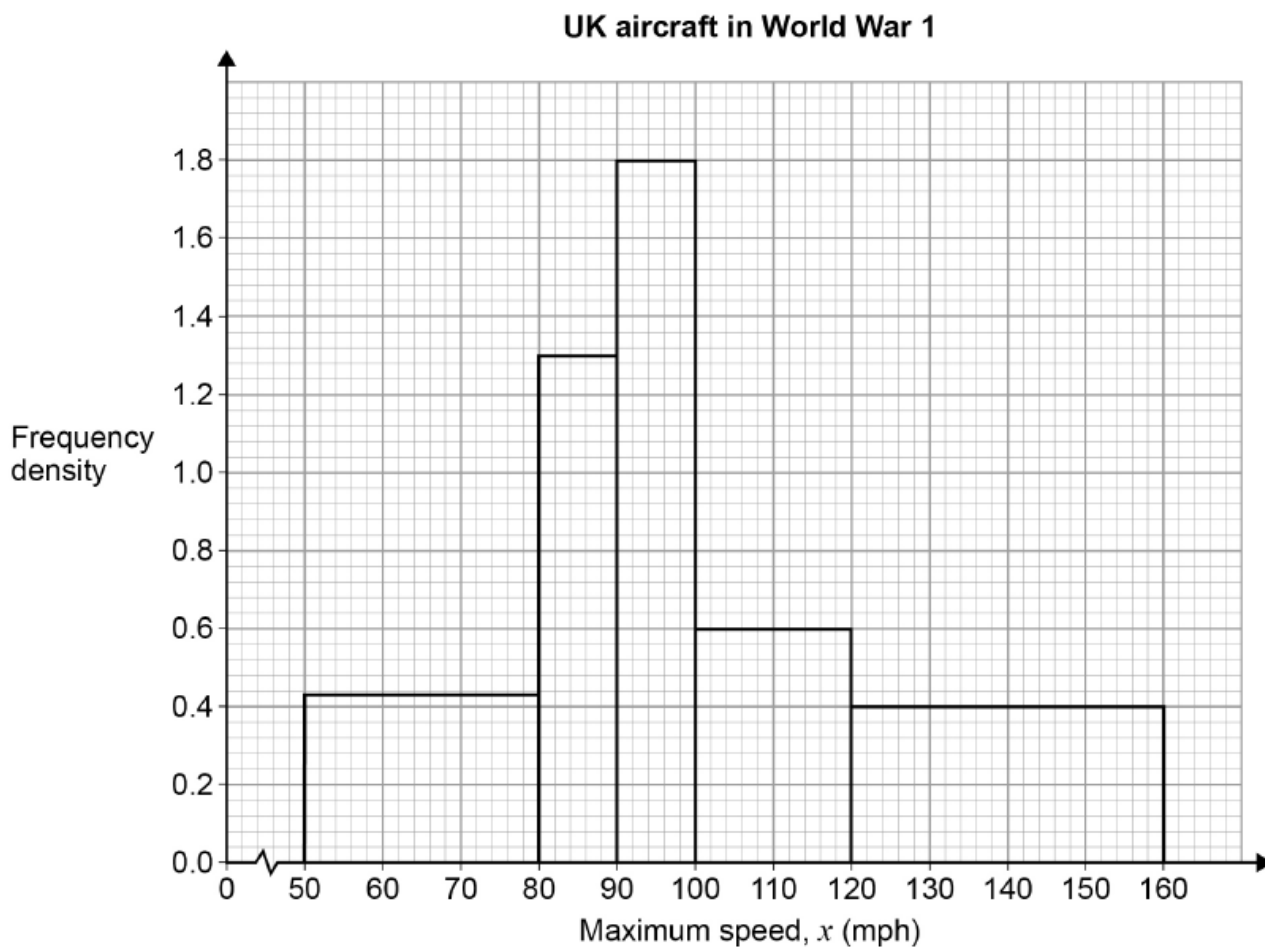
Maximum speed, x (mph)	Number of aircraft	
$100 \leq x < 200$	6	
$200 \leq x < 240$	9	
$240 \leq x < 280$	10	
$280 \leq x < 320$	6	
$320 \leq x < 400$	6	
$400 \leq x < 500$	3	

Complete the histogram to show the information.

[2 marks]



- (b) This histogram shows the maximum speed of the museum's 72 aircraft from World War 1



Estimate the number of these aircraft that had a maximum speed of between 90 mph and 115 mph.

[3 marks]

Answer _____

- (c) Ewan says that the fastest of the museum's aircraft from World War 1 is slower than all of the museum's aircraft from World War 2

Is Ewan correct?

Tick (✓) one box.

Yes

☐

No

☐

Cannot
tell

☐

Give a reason for your answer.

[2 marks]

Reason _____

6. No.7

Josh likes to play the game 'Knight Fort' with his friends.

When he logs on to his console some of his friends are usually already logged on.

Josh keeps a record over 5 consecutive days in **term time** of the number of friends logged on at 8pm.

The table shows the results.

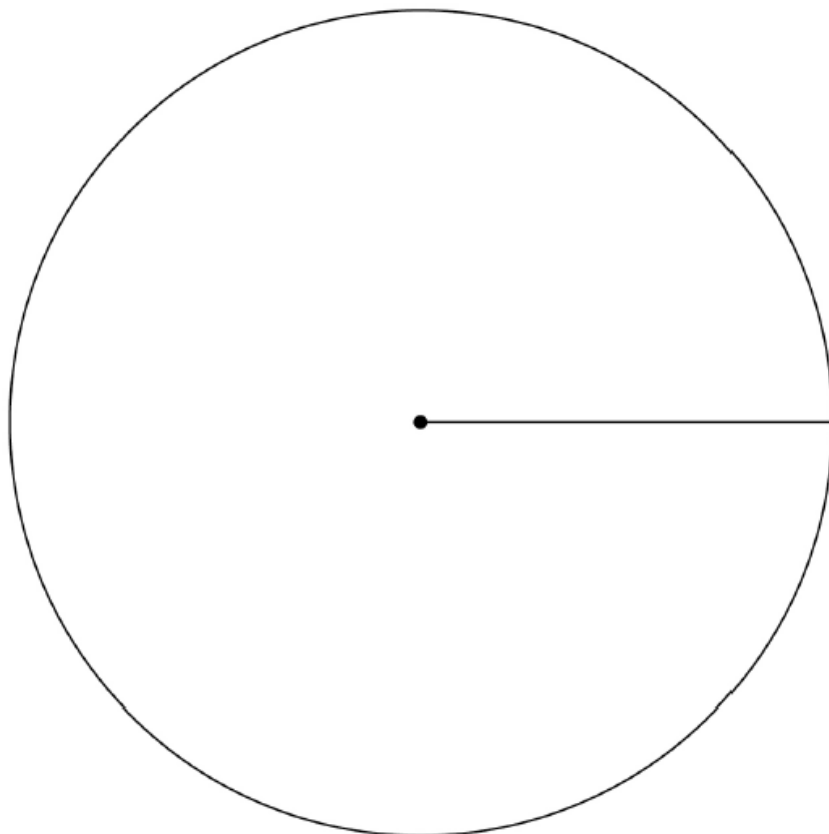
Day (term time)	Monday	Tuesday	Wednesday	Thursday	Friday
Number of friends	3	5	6	10	12

- (a) Describe the trend in the data.

[1 mark]

(b) Draw a fully labelled pie chart to illustrate the data.

[4 marks]

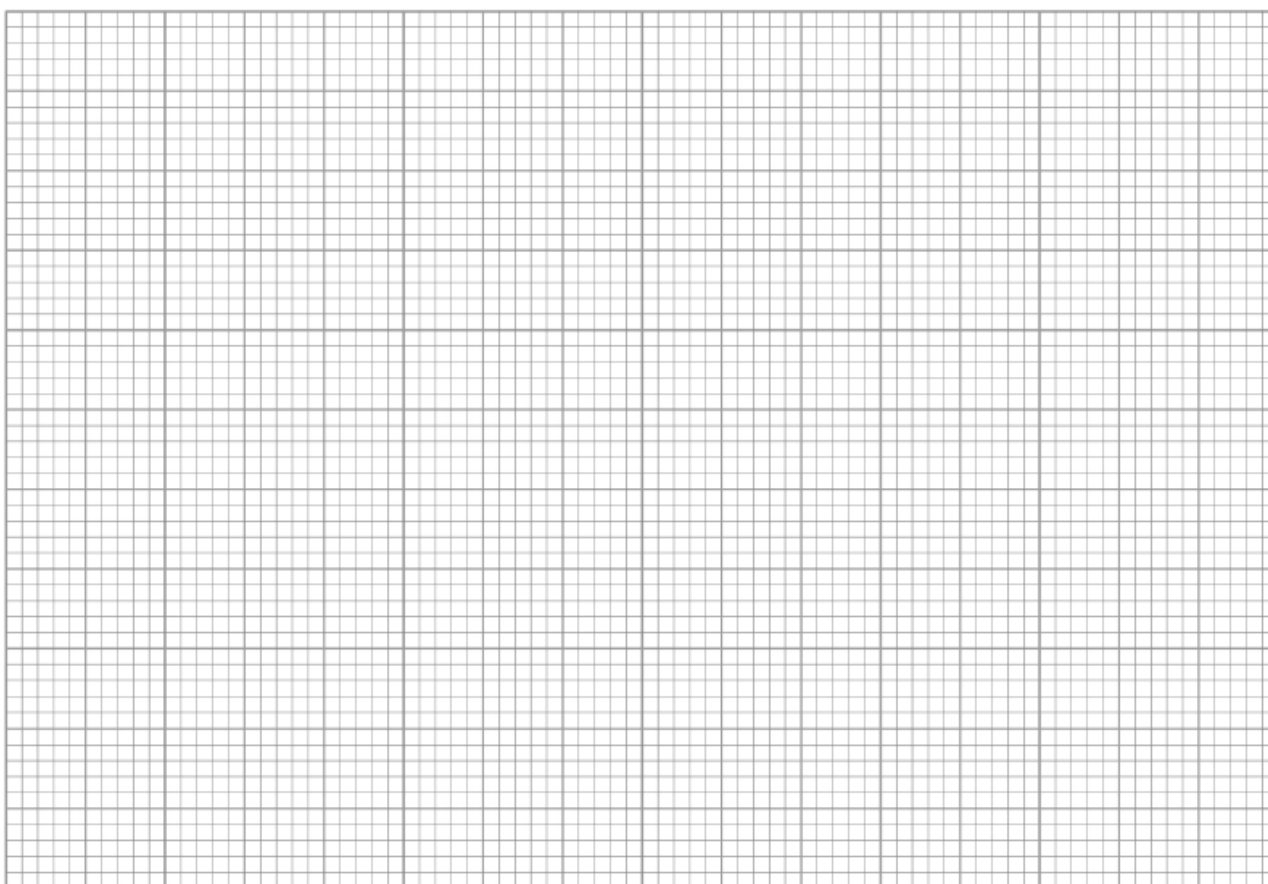


- (c) Josh also collected data for 8pm for 5 days in the **Easter holidays**.

Day (Easter holidays)	Monday	Tuesday	Wednesday	Thursday	Friday
Number of friends	15	14	11	10	8

On the grid below, draw a diagram suitable for showing **both** the term time and Easter holiday data at the same time.

[4 marks]



- (d) Comment, with justification, on whether these statements from Josh are true or false. [3 marks]

Statement 1

‘Overall, more friends are already logged on in the Easter holidays.’

Comment _____

Statement 2

‘Every day there were more friends already logged on in the Easter holidays than in term time.’

Comment _____

Statement 3

‘When the two sets of data are combined, the day having the most friends already logged on is Thursday.’

Comment _____

7. No.9

Some Year 11 girls investigate how much time different age groups spend on the internet.

- (a) Write down a possible hypothesis they could use.

[1 mark]

- (b) Keiva designs a data collection sheet.
The first few rows are shown.

Person	Age Group (0 – 10, 10 – 20 or over 20)	How long on internet?
1		
2		
3		
4		

Suggest **two** improvements to the data collection sheet.
Do **not** draw a new data collection sheet.

[2 marks]

Improvement 1 _____

Improvement 2 _____

- (c) Holly decides to collect her data by recording the exact age, in years, of everyone she asks.

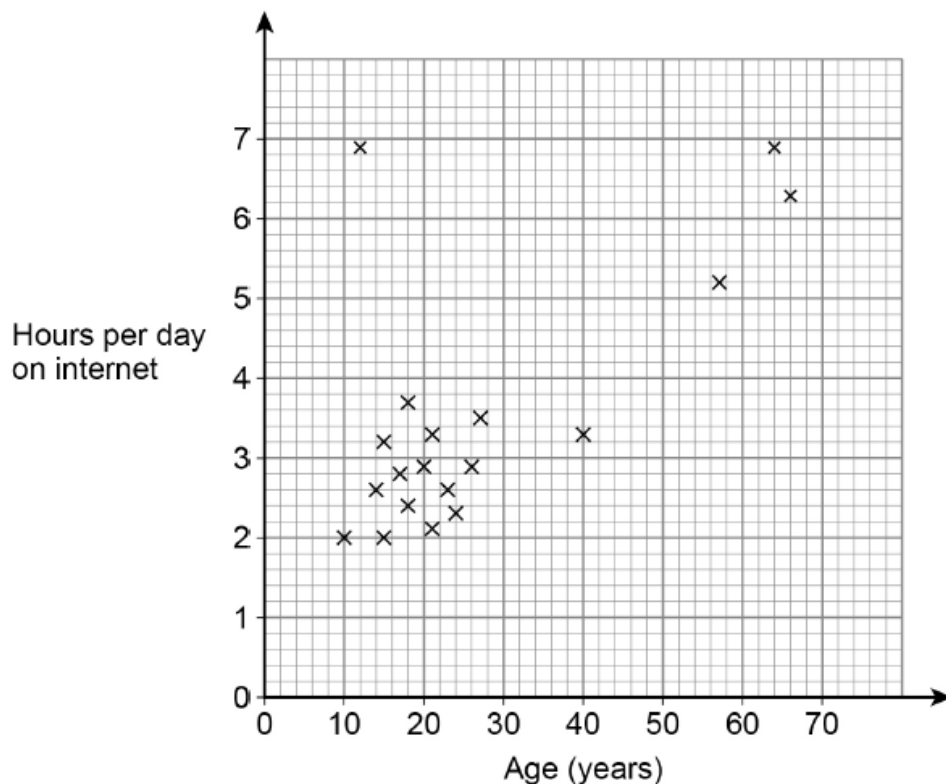
- (c) (i) Give **one** advantage of collecting exact ages over having age groups.

[1 mark]

- (c) (ii) Give **one** disadvantage of collecting exact ages over having age groups.

[1 mark]

- (d) The scatter diagram shows the results from Holly's data collection.
All points were correctly plotted.



- (d) (i) Give one criticism about the age of people Holly collected data from.

[1 mark]

- (d) (ii) Holly says,

"Apart from one outlier, my graph seems to show negative correlation."

Circle the outlier on the graph and comment on what Holly says about the correlation.

[2 marks]

(d) (iii) What does the correlation show in this context?

[1 mark]

(e) Courtney decides to use grouped data for her sample of people.

The table shows information about the time spent per day on the internet for a sample of people who are **over 50 years old**.

Time, h (hours)	Frequency		
$0 \leq h \leq 1$	44		
$1 < h \leq 2$	18		
$2 < h \leq 3$	10		
$3 < h \leq 4$	6		
$4 < h \leq 5$	2		

(e) (i) Work out how many people are in this sample.

[1 mark]

Answer _____

(e) (ii) Write down the largest value that the range of these data could be.

[1 mark]

Answer _____ hours

(e) (iii) Show that an estimate of the mean time this sample spent on the internet in a day is 1.3 hours.

You may use the blank columns in the table opposite to help you.

[3 marks]

- (f) Courtney also collected data for a group of people who are all **15 years old**.

The data has,

- an estimated mean of 1.6 hours on the internet per day
- a range of 6 hours.

Use this information, and your answers in **part (e)**, to make **two** comparisons of Courtney's data for people who are 15 years old and for people who are over 50 years old.

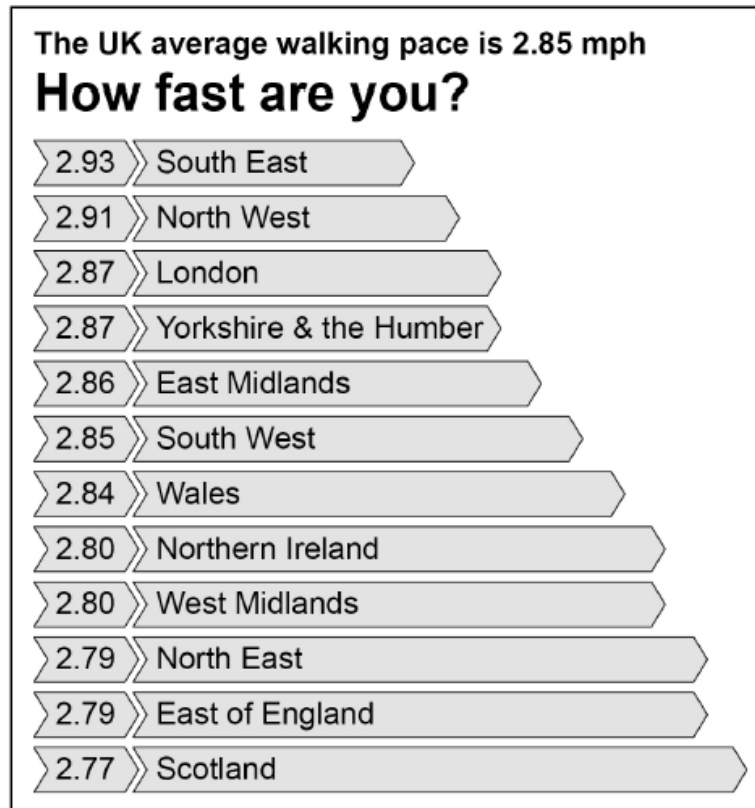
[2 marks]

Comparison 1 _____

Comparison 2 _____

8. No.10

Samira records the average walking speed, in miles per hour (mph), of shoppers in different regions of the UK. The diagram shows her results.



- (a) List the regions in the UK where the walking speed is more than 0.05 mph faster than the UK average.

[1 mark]

Answer _____

- (b) Give two reasons why the diagram is misleading.

[2 marks]

Reason 1 _____

Reason 2 _____

- (c) A manager in a shopping centre measures the walking speed (in mph) of a random sample of shoppers in June and a random sample of shoppers in December.

The walking speeds of 25 shoppers in June are shown in the stem-and-leaf diagram.

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

Key: 8 | 0 | 7 represents a speed of 0.8 mph in June
and a speed of 0.7 mph in December

- (c) (i) The speeds (in mph) of 25 shoppers in December are,

1.2 3.4 0.9 1.9 2.4 2.7 1.6 3.2 2.1 0.7
1.0 2.2 2.5 1.8 4.1 1.7 2.6 1.8 3.2 1.3
2.5 0.7 3.1 2.2 1.4

Complete the back to back stem-and-leaf diagram above to show the speeds of shoppers in December.

[3 marks]

- (c) (ii) Without further calculation, make a comparison of the average walking speeds of shoppers in June and December.

[1 mark]

- (c) (iii) Give a possible reason to explain the difference in average walking speeds in June and December.

[1 mark]

9. No.8

Maxine and Toby are investigating the amount of fat in supermarket ready meals.

- (a) They each design a table for collecting the data.

Maxine

Fat (grams)	Tally	Frequency
4 – 8		
8 – 12		
12 – 16		
16 – 20		
20 – 24		
24 – 28		
28 – 32		
32 – 36		
Over 36		

Toby

Fat, x (grams)	Tally	Frequency
$0 \leq x < 5$		
$5 \leq x < 10$		
$10 \leq x < 15$		
$15 \leq x < 20$		
$20 \leq x < 25$		
$25 \leq x < 30$		
$30 \leq x < 35$		
$35 \leq x < 40$		
$x \geq 40$		

Give two different reasons why Toby's table is more suitable than Maxine's.

[2 marks]

Reason 1 _____

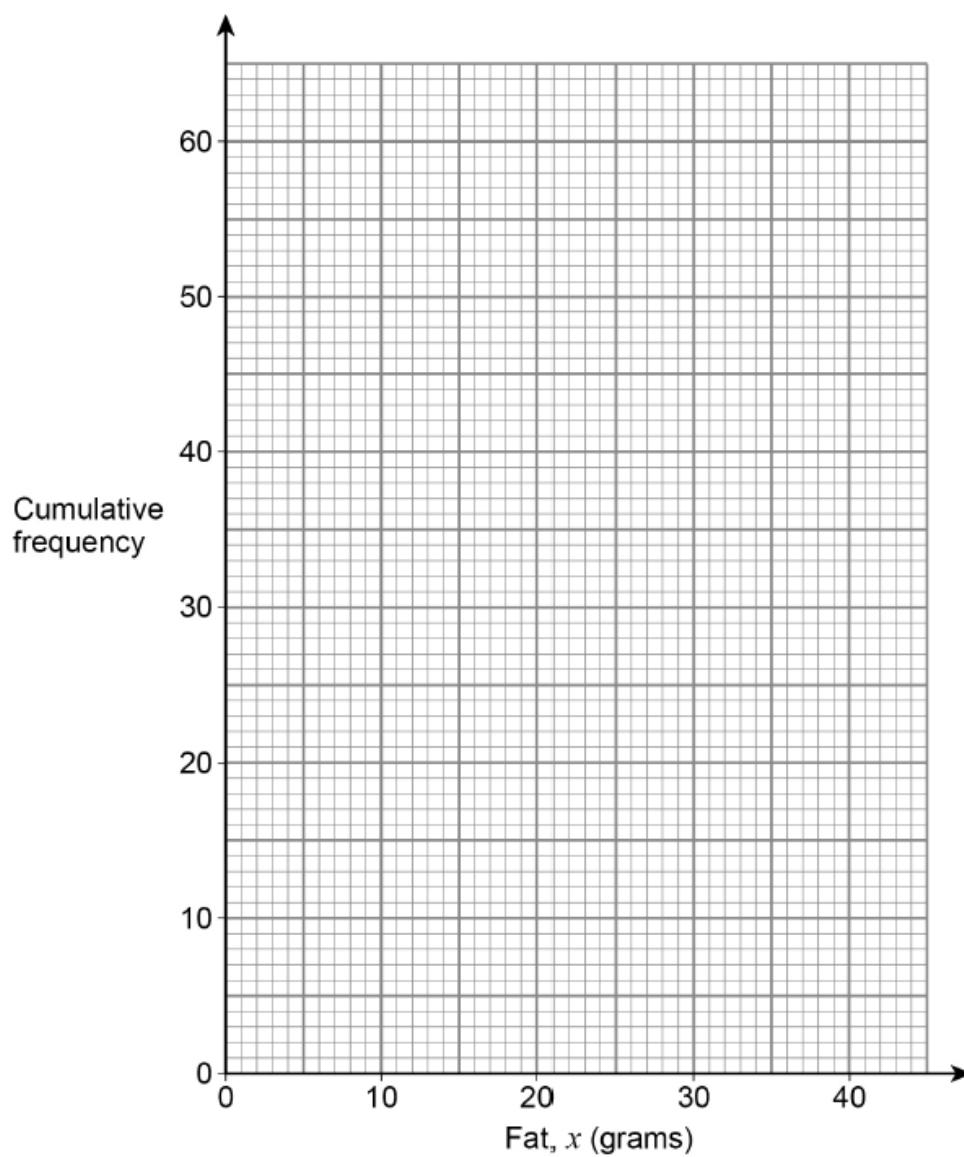
Reason 2 _____

- (b) Toby records the amount of fat in ready meals made for one person.
He collects this information from 60 ready meals sold at his local supermarket.

Fat, x (grams)	Cumulative frequency
$x < 5$	0
$x < 10$	8
$x < 15$	23
$x < 20$	34
$x < 25$	48
$x < 30$	54
$x < 35$	59
$x < 40$	60

(b) (i) Draw a cumulative frequency graph to show Toby's results.

[3 marks]



- (b) (ii) Use your cumulative frequency graph to work out an estimate of the 70th percentile.
[2 marks]

Answer _____ grams

- (b) (iii) Toby had previously carried out the same investigation 5 years ago.

He found then that 30% of ready meals contained more than 25 grams of fat.

Has there been a reduction in the percentage of ready meals containing more than 25 grams of fat?

Tick (✓) one box.

Yes

☐

No

☐

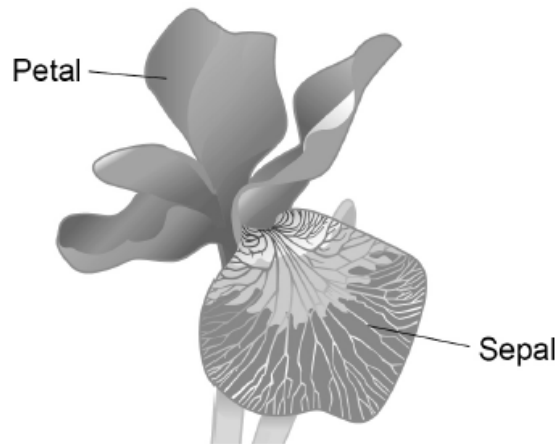
Give a reason for your answer.

[1 mark]

10. No.10

An iris is a type of flowering plant.

The flower of the iris is made up from petals and sepals.



A scientist collected the length and width of petals and of sepals from samples of iris flowers.

The scatter diagrams show sepal lengths (cm) plotted in turn against each of the other variables.

The scientist's computer automatically draws a line of best fit on each diagram.

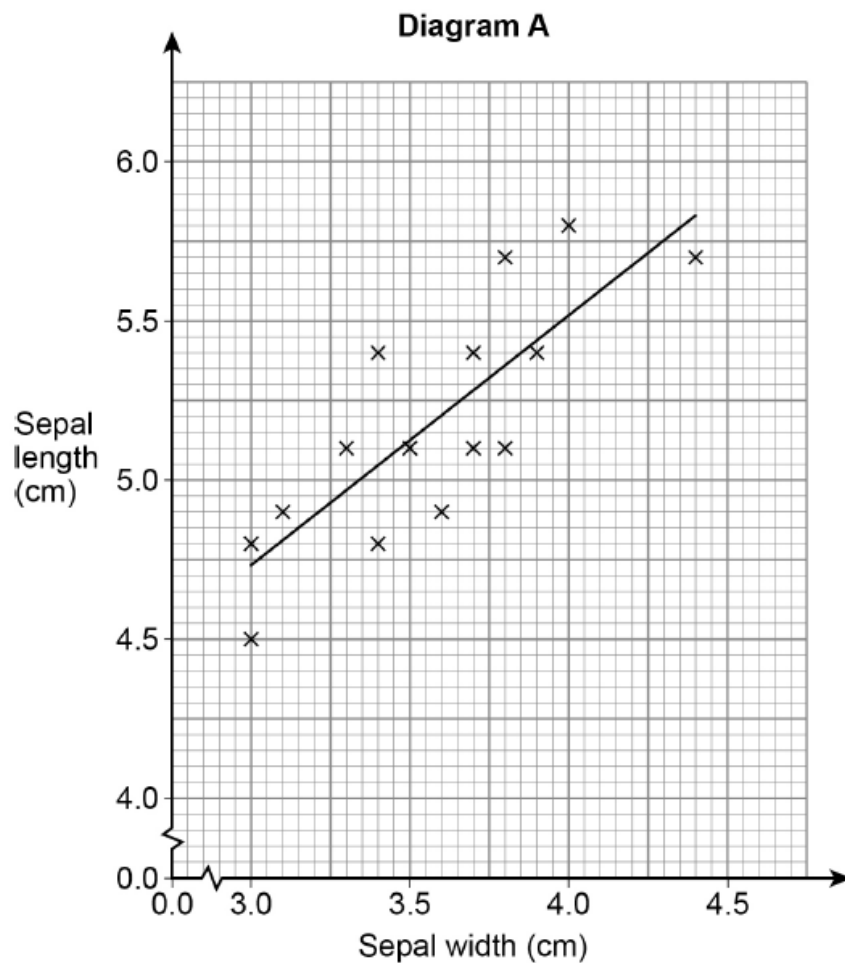
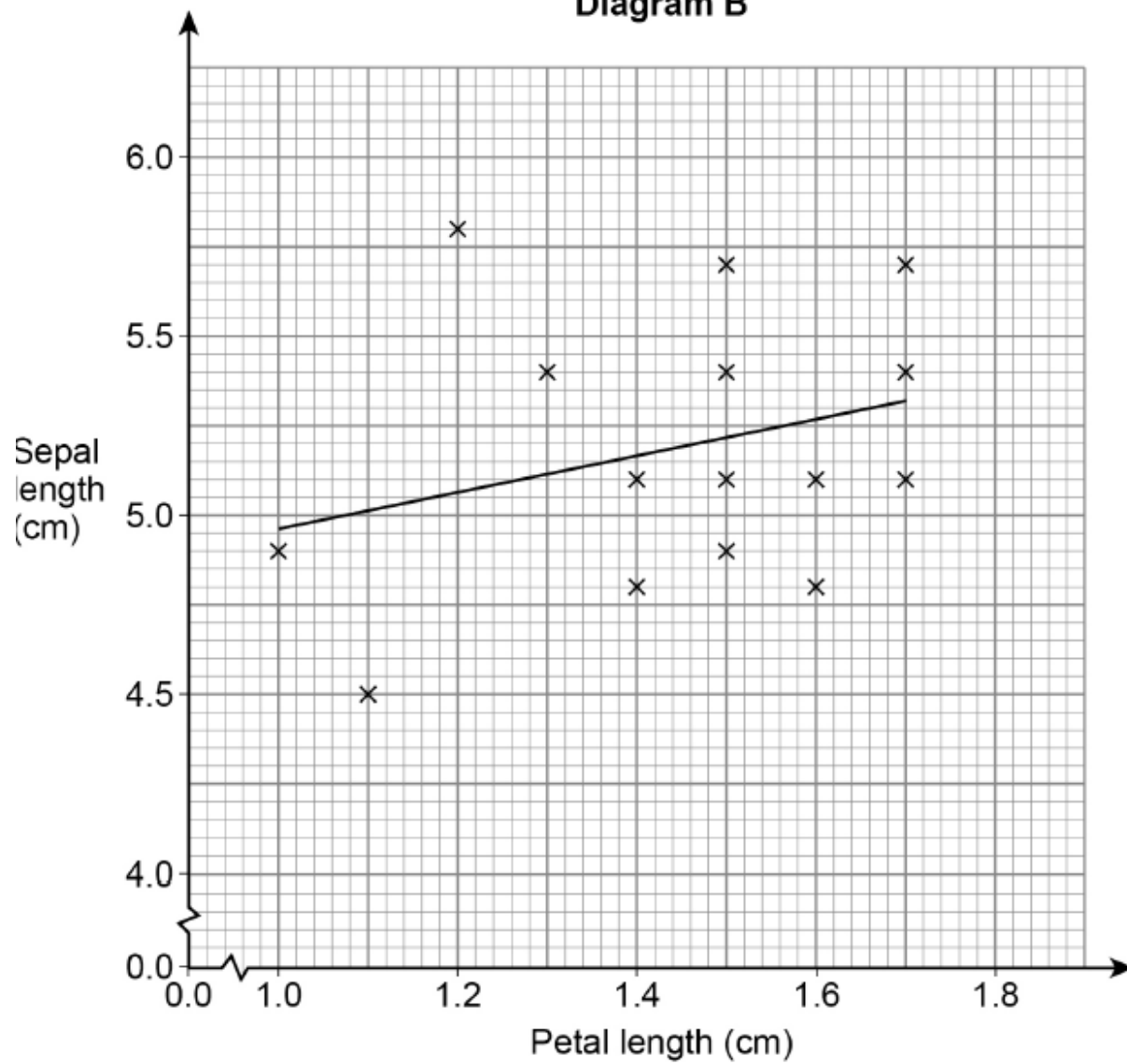
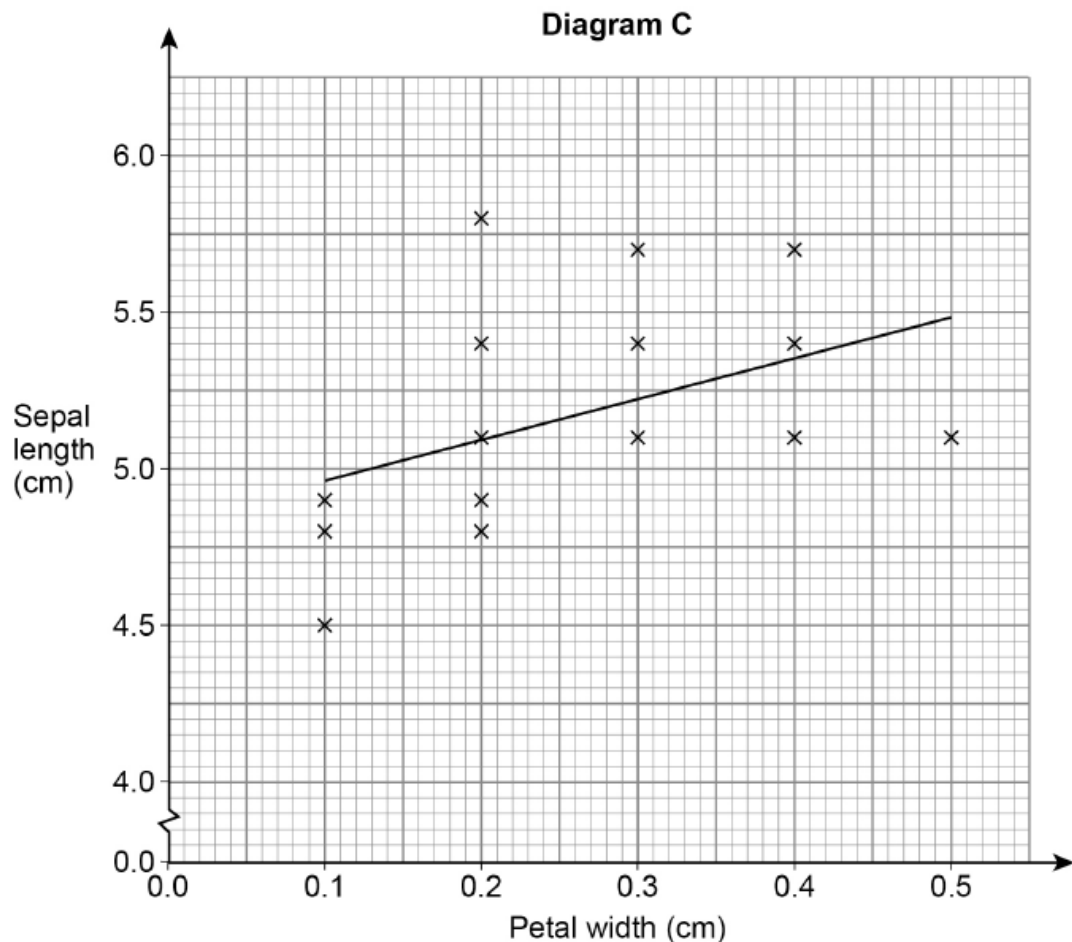


Diagram B



Some of the measurements of another iris flower are,

Sepal width = 3.2 cm

Petal length = 1.2 cm

Petal width = 0.1 cm

Use **one** of the scatter diagrams to predict the **sepal length** of this flower.

You should state which diagram you chose to use and give a **statistical** reason for your choice.

[3 marks]

Scatter graph used _____

Reason for choice _____

Sepal length _____ cm

11. No.16

University undergraduate degrees are graded as First Class, Upper Second Class, Lower Second Class, Third Class or Pass.

Luca wants to investigate how the number of degrees awarded in the UK in 2016 compares with the number awarded in the UK in 2008.

He also wants to see if there are any changes in the proportion of First Class degrees awarded.

He collects data about degree results from the website hesa.ac.uk.

The **Data Sheet** contains the data he collects for degrees awarded in the UK in 2016.

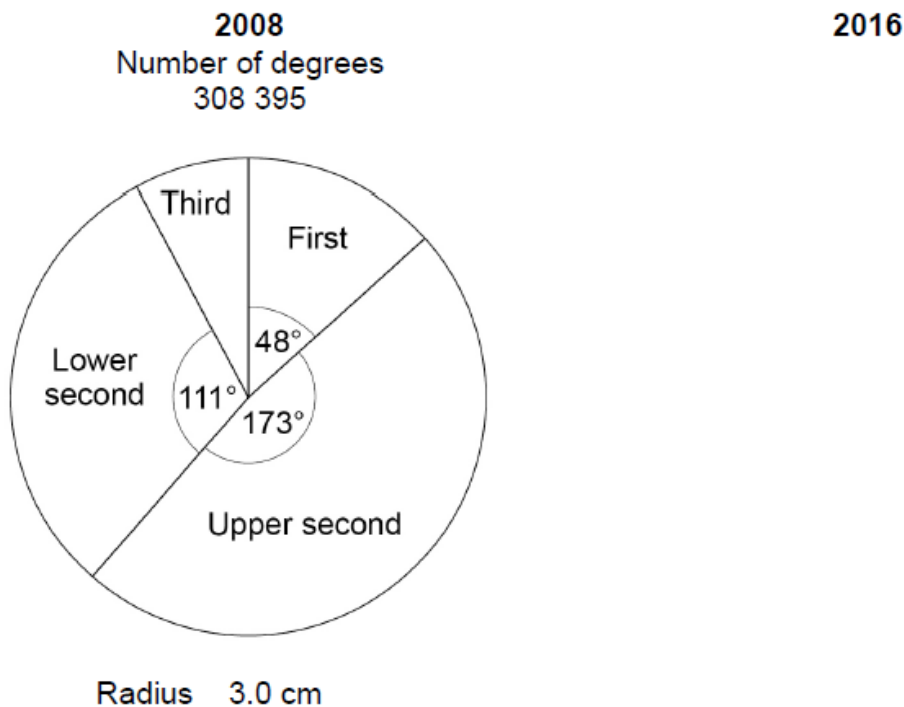
- (a) Luca uses secondary data for his investigation.

Explain why it would **not** be sensible for him to collect primary data.

[1 mark]

He decides to use **comparative pie charts** to show the data.

He draws this pie chart to show the grades of degree awarded in 2008.



- (b) Give **one** reason why comparative pie charts are a suitable way to show the data. [1 mark]

- (c) Draw the corresponding pie chart for 2016 next to the one for 2008.
Use the information from the 2008 pie chart and **TABLE 1** on the **Data Sheet**.
You **must** show your working.

[6 marks]

- (d) More **First Class** degrees were awarded in 2016 than in 2008.
How many more?

[3 marks]

Answer _____

- (e) Luca makes the following conclusion,

‘It has become easier to get a First Class degree in the UK.’

Give **one** reason why Luca’s conclusion may **not** be correct.

[1 mark]

- (f) Luca extends his investigation by exploring the proportion of full-time students awarded a First Class degree compared to the proportion of part-time students awarded a First Class degree.

The data for 2016 are shown on the **Data Sheet** in **TABLE 2**.

Compare these proportions.

[3 marks]
