Problem Solving with Data Handling

Name: Answers

Class: _____

Time: 1 hour 20 mins	
Total marks available: 70	**Total marks achieved**: _____

Q1.

* 14 students did a history test.

Here are the results.

Girls	3	8	2	4	3	4	4	6
Boys	3	6	3	3	1	4		

Adele says,
"The range of the girls' marks is 1 more than the range of the boys' marks."
Is Adele right?
You must show your working.

Girls range = 8 - 2 = 6

Boys range = 6 - 1 = 5

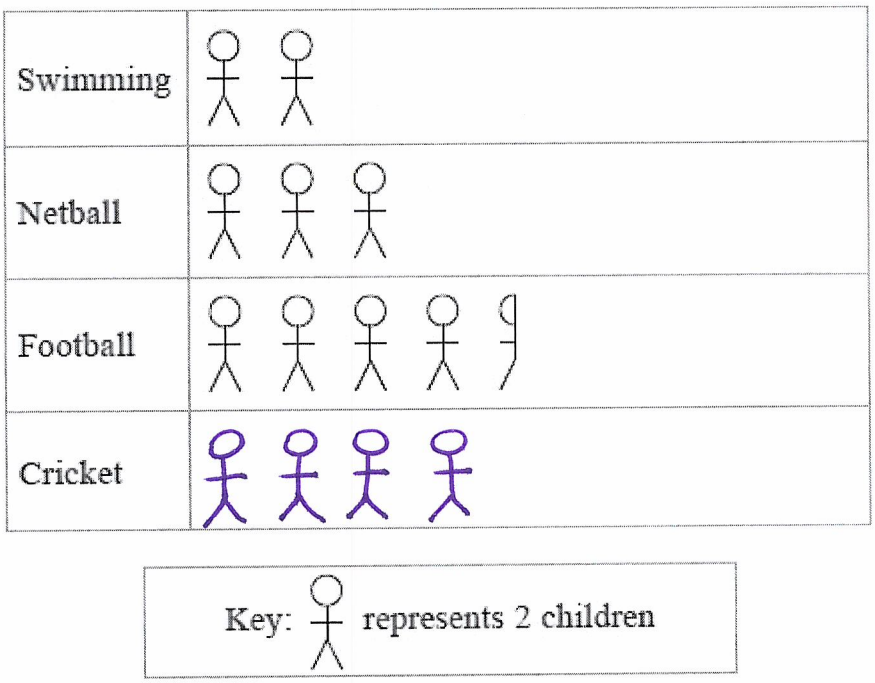
Adele is correct.

(Total for Question is 3 marks)

Q2.

Heidi asks all the children in her class to tell her the sport they like best.

The pictogram shows how many children like swimming best, like netball best and like football best.



8 children like cricket best.

(a) Use this information to complete the pictogram.

(1)

(b) Work out the total number of children in Heidi's class.

27

(2)

(Total for question = 3 marks)

Q3.

Liz asks 20 people to name the flavour of chocolate they like best.

Here are her results.

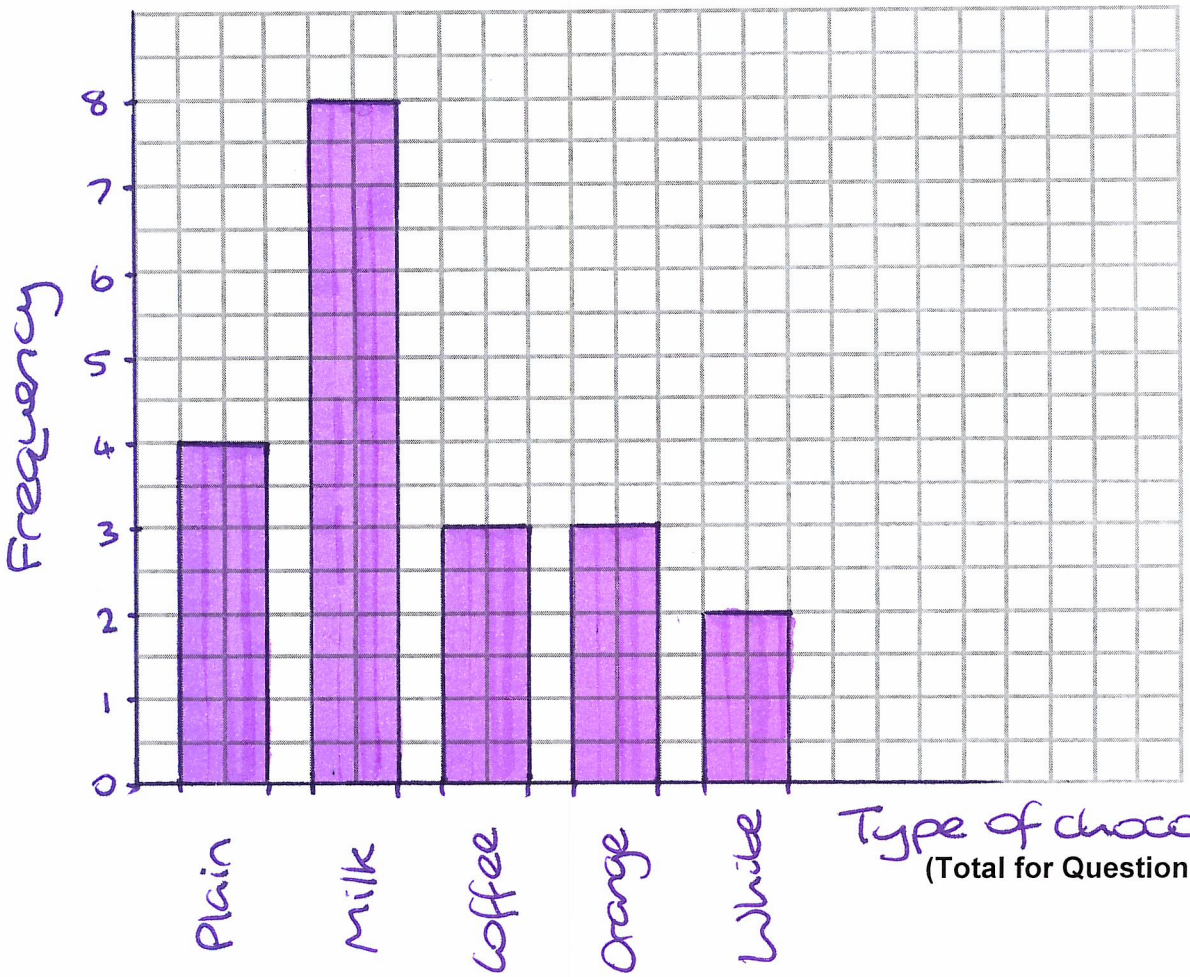
milk	plain	orange	plain	milk
coffee	white	milk	milk	orange
white	coffee	plain	milk	milk
milk	plain	coffee	milk	orange

(a) Complete the frequency table.

Flavour of chocolate	Tally	Frequency
plain	IIII	4
milk	𝍸 III	8
coffee	III	3
orange	III	3
white	II	2

(2)

(b) On the grid, draw a suitable chart or diagram to show Liz's results.



(3)

(Total for Question is 5 marks)

Q4.

Milk is sold in $\frac{1}{2}$ pint bottles, in 1 pint bottles and in 2 pint bottles.

One weekend a shop sold 100 bottles of milk.

46 of the bottles were sold on Sunday.
15 of the bottles sold on Sunday were 2 pint bottles.

31 of the bottles sold on Saturday were $\frac{1}{2}$ pint bottles.
22 of the bottles sold were 2 pint bottles.
30 of the bottles sold were 1 pint bottles.

How many 1 pint bottles were sold on Sunday?

	Saturday	Sunday	Total
½ pint	31	17	48
1 pint		(14)	30
2 pints		15	22
Total		46	100

14

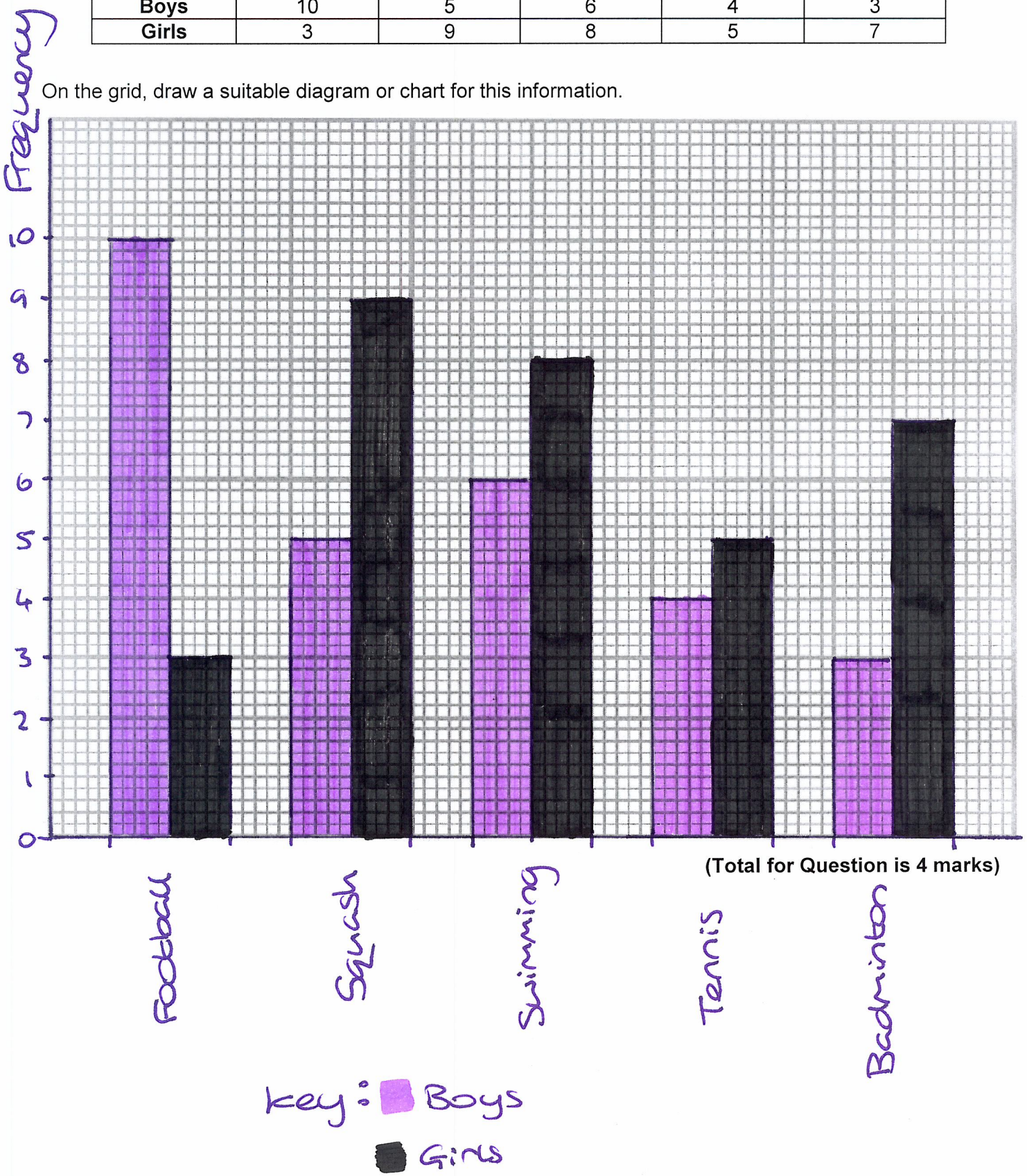
(Total for question = 4 marks)

Q5.

The table shows information about some students' favourite sports.

	Football	Squash	Swimming	Tennis	Badminton
Boys	10	5	6	4	3
Girls	3	9	8	5	7

On the grid, draw a suitable diagram or chart for this information.



(Total for Question is 4 marks)

Q6.

There are 25 students in a class.
12 of the students are girls.

Here are the heights, in cm, of the 12 girls.

160 173 148 154 152 164 179 164 162 174 168 170

(a) Show this information in an ordered stem and leaf diagram.

14	8
15	2 4
16	0 2 4 4 8
17	0 3 4 9

Key
14|8 = 148cm

(3)

There are 13 boys in the class.

Here are the heights, in cm, of the 13 boys.

157 159 162 166 168 169 170 173 174 176 176 181 184

* (b) Compare the heights of the boys with the heights of the girls.

	Median	Range
Girls	164	31
Boys	170	27

The boys are taller on average and their heights are more consistent.

(3)

(Total for Question is 6 marks)

Q7.

People can buy three types of plane tickets.

They can buy

an Economy ticket
a Premium ticket
or a Business ticket

200 people buy plane tickets.

92 males buy tickets
30 of the males buy Business tickets
62 females buy Economy tickets

A total of 44 people buy Business tickets.
A total of 60 people buy Premium tickets.

How many males buy Premium tickets?
You must show all your working.

	Male	Female	Total
Economy	34	62	96
Premium	(28)		60
Business	30		44
Total	92		200

28

(Total for question = 4 marks)

Q8.

A group of Year 10 students was asked to choose a new subject to study.

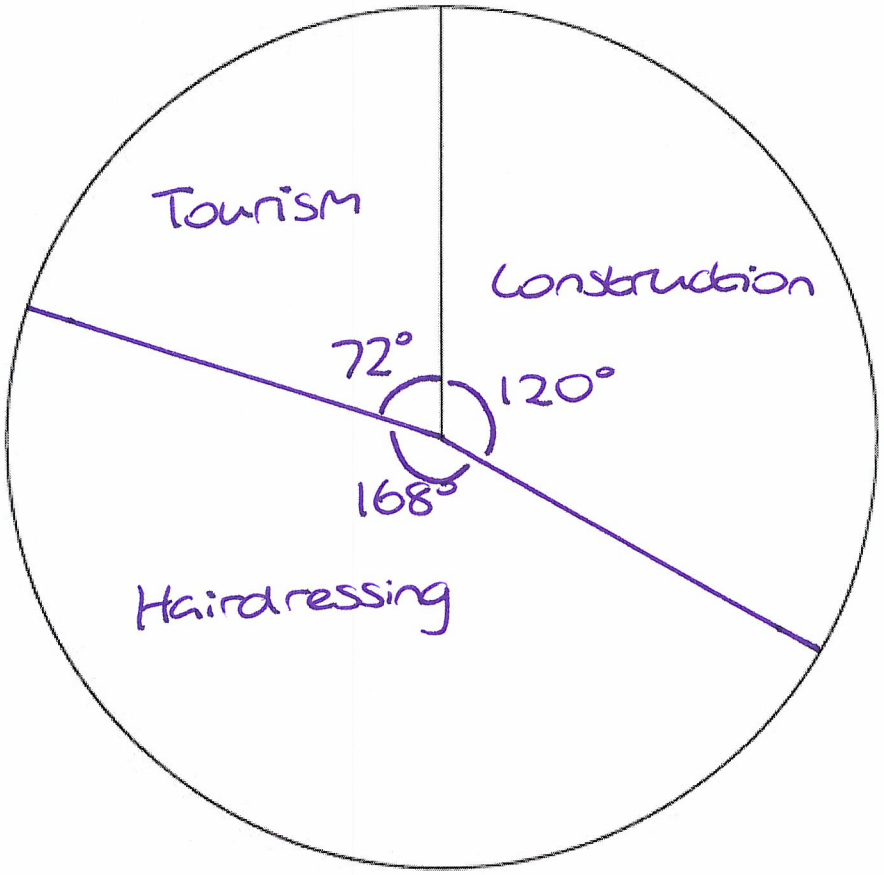
The table shows information about the choices.

Subject	Number of students	Degrees
construction	40	120°
hairdressing	56	168°
tourism	24	72°

(a) Draw an accurate pie chart to show this information.

×3

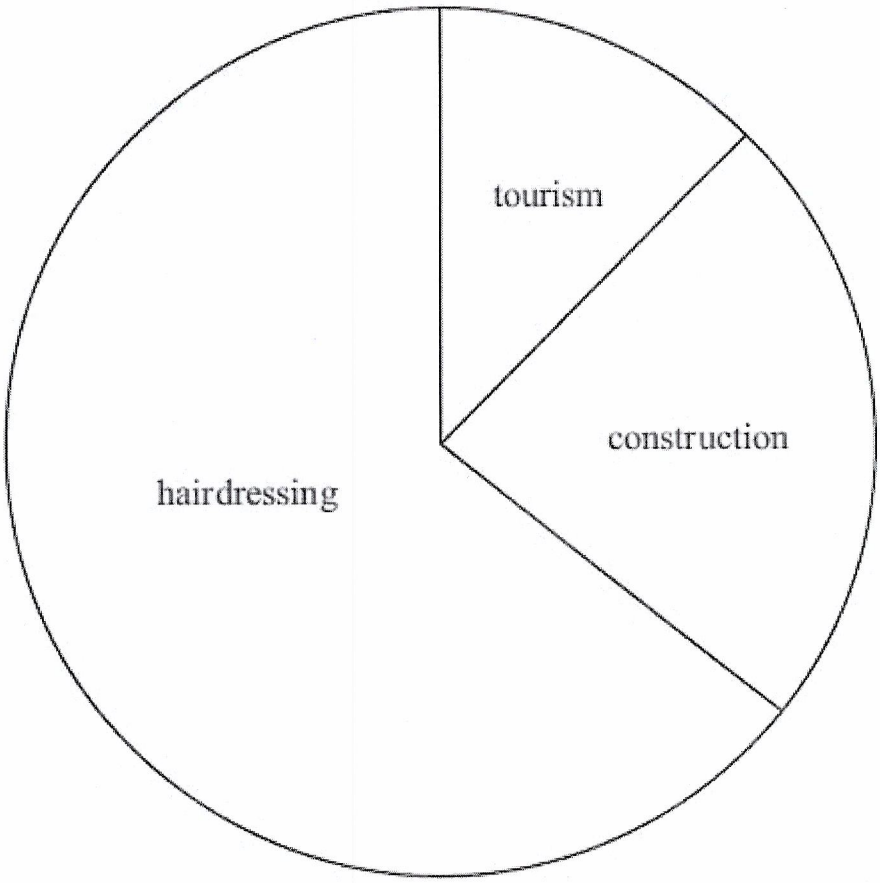
Total 120



(3)

A group of Year 11 students was also asked to choose a new subject to study.

This pie chart shows information about their choices.



Danny says

"The pie charts show that hairdressing was chosen by more Year 11 students than by Year 10 students."

(b) Is Danny correct? Unsure

You must explain your answer.

We do not know the number of students in year 11 so cannot compare.

(1)

(Total for Question is 4 marks)

Q9.

Jenny works in a shop that sells belts.

The table shows information about the waist sizes of 50 customers who bought belts from the shop in May.

Belt size	Waist (w inches)	Frequency	fx
Small	$28 < w \leqslant 32$ 30	24	720
Medium	$32 < w \leqslant 36$ 34	12	408
Large	$36 < w \leqslant 40$ 38	8	304
Extra Large	$40 < w \leqslant 44$ 42	6	252

(a) Calculate an estimate for the mean waist size.

$\frac{\Sigma fx}{\Sigma f} = \frac{1684}{50} = 33.68$ inches

33.68 ..... inches

(3)

Belts are made in sizes Small, Medium, Large and Extra Large.

Jenny needs to order more belts in June.
The modal size of belts sold is Small.

Jenny is going to order ¾ of the belts in size Small.

The manager of the shop tells Jenny she should **not** order so many Small belts.

(b) Who is correct, Jenny or the manager?
You must give a reason for your answer.

$\frac{24}{50}$ = approximately half.

The manager is correct - Jenny should order ½ small, not ¾

(2)

(Total for question is 5 marks)

Q10.

Here is the number of goals scored by a football team in each of its first 10 games.

3 1 4 2 0 1 1 1 3 2

(a) Write down the mode.

1

(1)

(b) Work out the mean number of goals for the first 10 games.

$\frac{18}{10}$

1.8

(2)

In the 11th game the team scored 4 goals.
In the 12th game the team scored 2 goals.

*(c) Will the mean number of goals for the 12 games be greater than or less than the mean number of goals for the first 10 games?
You must explain your answer.

$\frac{18 + 4 + 2}{12} = 2$

The mean will be greater.

(2)

(Total for Question is 5 marks)

Q11.

Here are the heights, in metres, that 10 men jumped in a high jump competition.

2.19 2.23 2.23 2.23 2.26 2.28 2.29 2.29 2.31 2.33

(a) For these heights, find

(i) the mode,

2.23 m

(ii) the mean,

$\frac{22.64}{10}$

2.264 m

(iii) the range.

0.14 m

(4)

In a high jump competition for women, the heights, in metres, that 10 women jumped were recorded.
For these heights

the mean was 1.95 m
the range was 0.18 m

(b) Compare the heights that the men jumped with the heights that the women jumped.

On average the men jumped further.

The men's distances were more consistent.

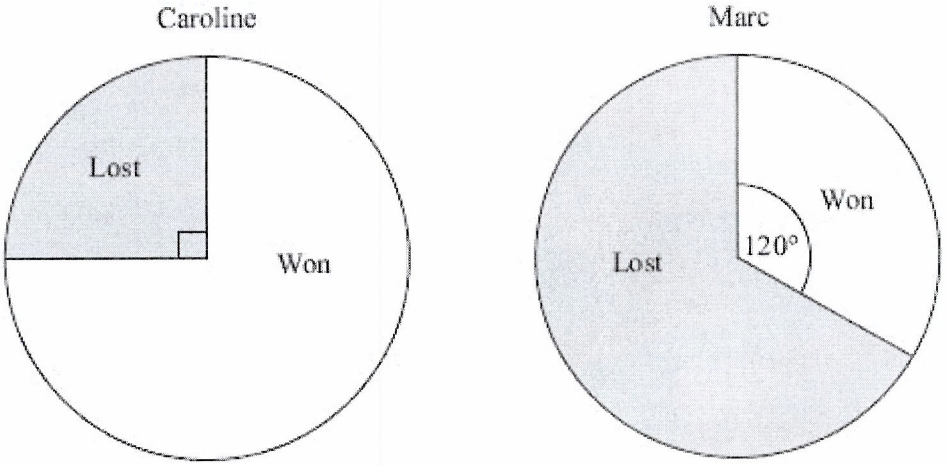
(2)

(Total for Question is 6 marks)

Q12.

Caroline and Marc are in a darts team.

The pie charts show information about the number of games Caroline and Marc each won last year.
They also show information about the number of games Caroline and Marc each lost last year.



Caroline played 52 games.
Marc played 150 games.

Marc won more games than Caroline.

How many more?

Caroline → $\frac{3}{4}$ of 52 = 39

Marc → $\frac{1}{3}$ of 150 = 50

50 − 39 = 11

11

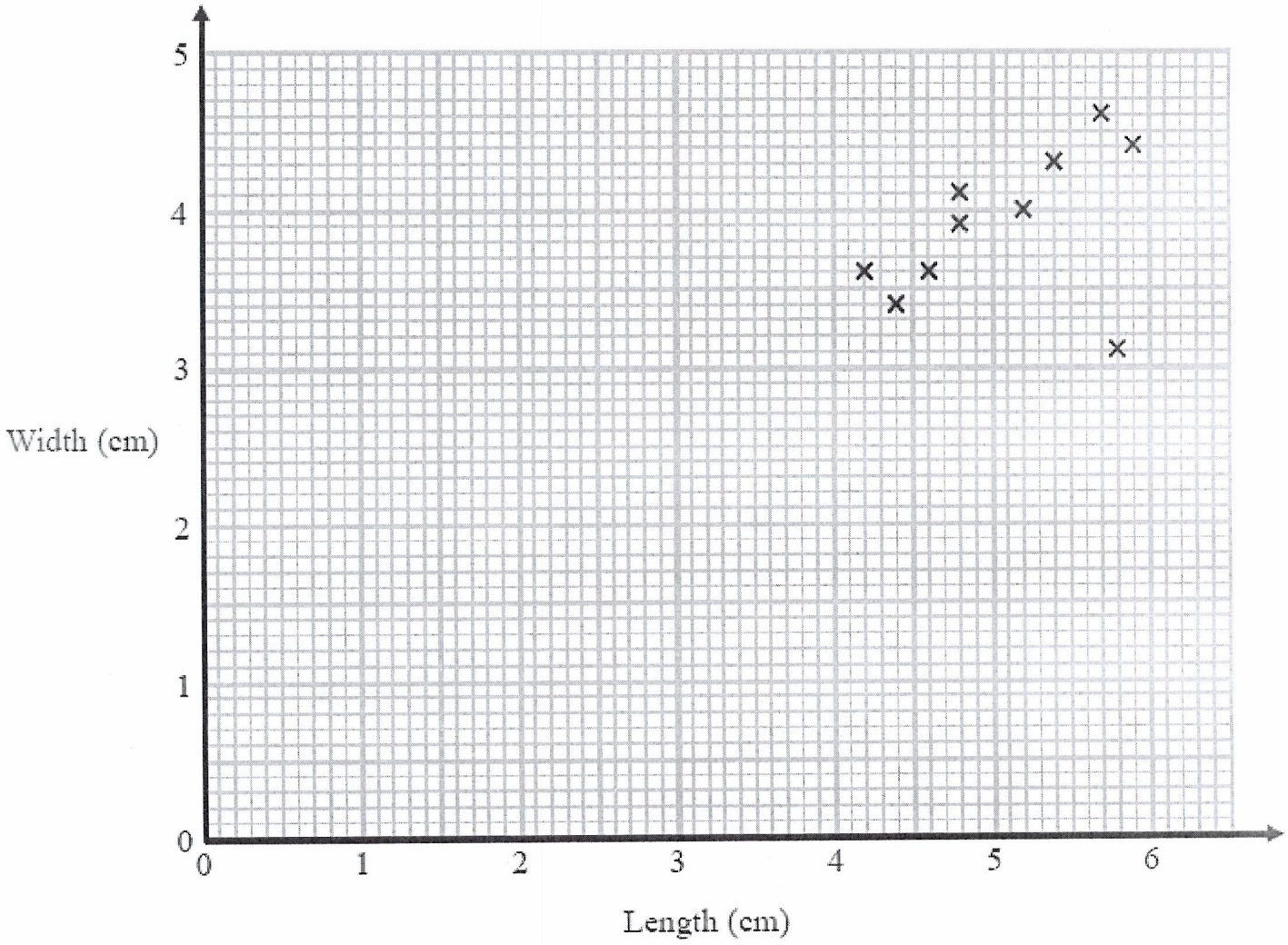
.....

(Total for Question is 3 marks)

Q13.

Katie measured the length and the width of each of 10 pine cones from the same tree.

She used her results to draw this scatter graph.



(a) Describe one improvement Katie can make to her scatter graph.

Not start axes at (0,0)

(1)

The point representing the results for one of the pine cones is an outlier.

(b) Explain how the results for this pine cone differ from the results for the other pine cones.

Proportionally longer and narrower than the others.

(1)

(Total for question = 2 marks)

Q14.

There are 1200 students at a school.

Kate is helping to organise a party.
She is going to order pizza.

Kate takes a sample of 60 of the students at the school.
She asks each student to tell her **one** type of pizza they want.

The table shows information about her results.

Pizza	Number of students
ham	20
salami	15
vegetarian	8
margherita	17

Work out how much ham pizza Kate should order.
Write down any assumption you make **and** explain how this could affect your answer.

1200 ÷ 60 = 20

20 × 20 = 40 ham pizzas.

Assumed that sample is representative of whole population

(Total for question = 3 marks)

Q15.

Michael carried out a survey of the time, in minutes, it takes the 20 people in his office to get to work. This table gives some information about his results.

Time (t minutes)	Frequency
$0 < t \leqslant 10$	8
$10 < t \leqslant 20$	6
$20 < t \leqslant 30$	1
$30 < t \leqslant 40$	4
$40 < t \leqslant 50$	1

Michael used this information to work out the mean of the times taken.
He got an answer of 68 minutes.

(a) Explain why it is impossible for the mean time to be 68 minutes.

The greatest time in the table is 50 mins.

(1)

The 20 people in the survey had:
a mean age of 45 years
a median age of 41 years

Michael decides to include his age so that he works out the mean age and median age of 21 people.
Michael is 42 years old.

Here are two statements about the ages of the 21 people.

Statement 1: The mean age of the 21 people is less than 45 years.

Statement 2: The median age of the 21 people is more than 41 years.

(b) (i) Is statement 1 correct?
You must give a reason to support your answer.

Yes because Michael's age is lower than the mean so will lower it further.

(ii) Is statement 2 correct?
You must give a reason to support your answer.

Possibly depending on how many 41 year-olds were surveyed.

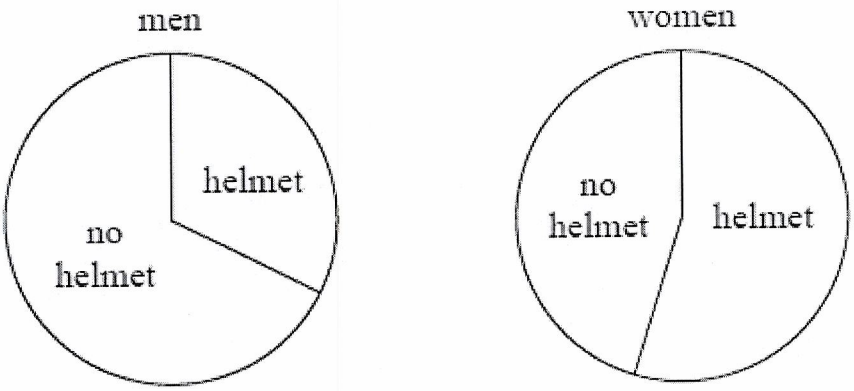
(2)

(Total for question = 3 marks)

Q16.

Imran carried out a survey on the wearing of cycle helmets by the men and the women living in his village.

He used the information he collected to draw two pie charts.



Mary looks at the two pie charts.

She says:

"The pie charts show that more women wear helmets than men."

(a) Is Mary right?
You must explain your answer.

We cannot be sure because we do not know the numbers represented in each.

(1)

Imran chose to draw pie charts to display the results of his survey.

(b) Are pie charts the best way to show this information?
You must explain your answer.

- Yes as they are good for comparing proportions.
- No because a bar chart would be better to compare numbers.

(1)

(Total for question = 2 marks)

Q17.

The manager of a clothes shop recorded the size of each dress sold one morning.

10	10				
12	12				
14	14	14	14	14	14
16	16	16	16		
18	18	18			
20	20	20			

The sizes of dresses are always even numbers.
The mean size of the dresses sold that morning is 15.3

The manager says,

"The mean size of the dresses is **not** a very useful average."

(i) Explain why the manager is right.

Because 15.3 is not a clothes size.

(ii) Which is the more useful average for the manager to know, the median or the mode?
You must give a reason for your answer.

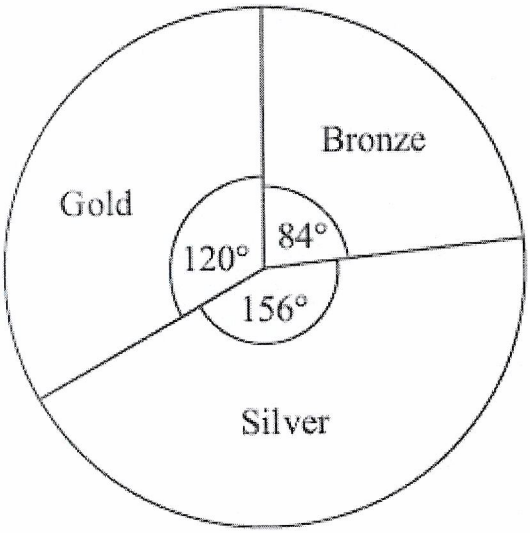
The mode would help the manager order more of the most popular size.

(Total for question is 2 marks)

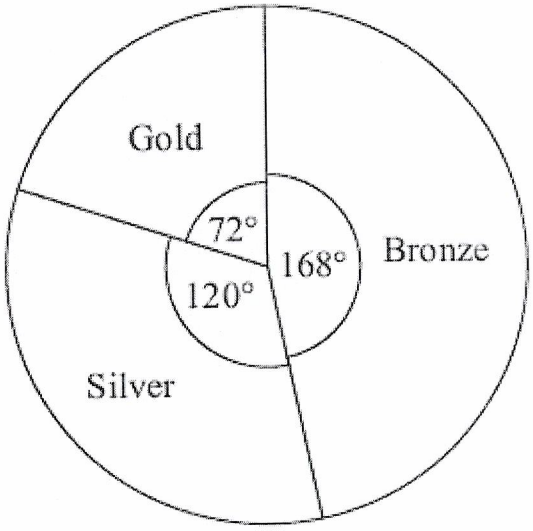
Q18.

The pie charts show some information about the numbers of medals won by Germany and by the Russian Federation in the 2010 Winter Olympics.

Medals won by Germany



Medals won by the Russian Federation



Germany won 7 bronze medals.

(a) How many gold medals did Germany win?

$84° \div 7 = 12°$

$120° \div 12° = 10$

10 gold medals.

(2)

(b) Graham says,
'The pie charts show that Germany won more gold medals than the Russian Federation'.
Is Graham right? Unsure
You must explain your answer.

We cannot be sure as we do not know any numbers of medals won by Russia.

(1)

(Total for Question is 3 marks)

Q19.

Ed has 4 cards.
There is a number on each card.

The mean of the 4 numbers on Ed's cards is 10

Work out the number on the 4th card.

$$\frac{12+6+15+x}{4} = 10$$

$$33 + x = 40$$

.....7.....

(Total for Question is 3 marks)