Write your name here

Surname	Other names

Pearson Edexcel Award

Centre Number	Candidate Number

Statistical Methods

Level 2
Calculator allowed

Monday 16 January 2017 – Morning
Time: 1 hour 30 minutes

Paper Reference
AST20/01

You must have:
Pen, HB pencil, eraser, calculator, ruler.

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.*
- **Calculators may be used.**
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.

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.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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P 4 8 3 3 9 A 0 1 2 0

Pearson

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Here are some words that can be used to describe types of data.

discrete **continuous** **categorical**

Use a word from the list to complete correctly the following sentences.

The weight of a fish is an example of ..... data.

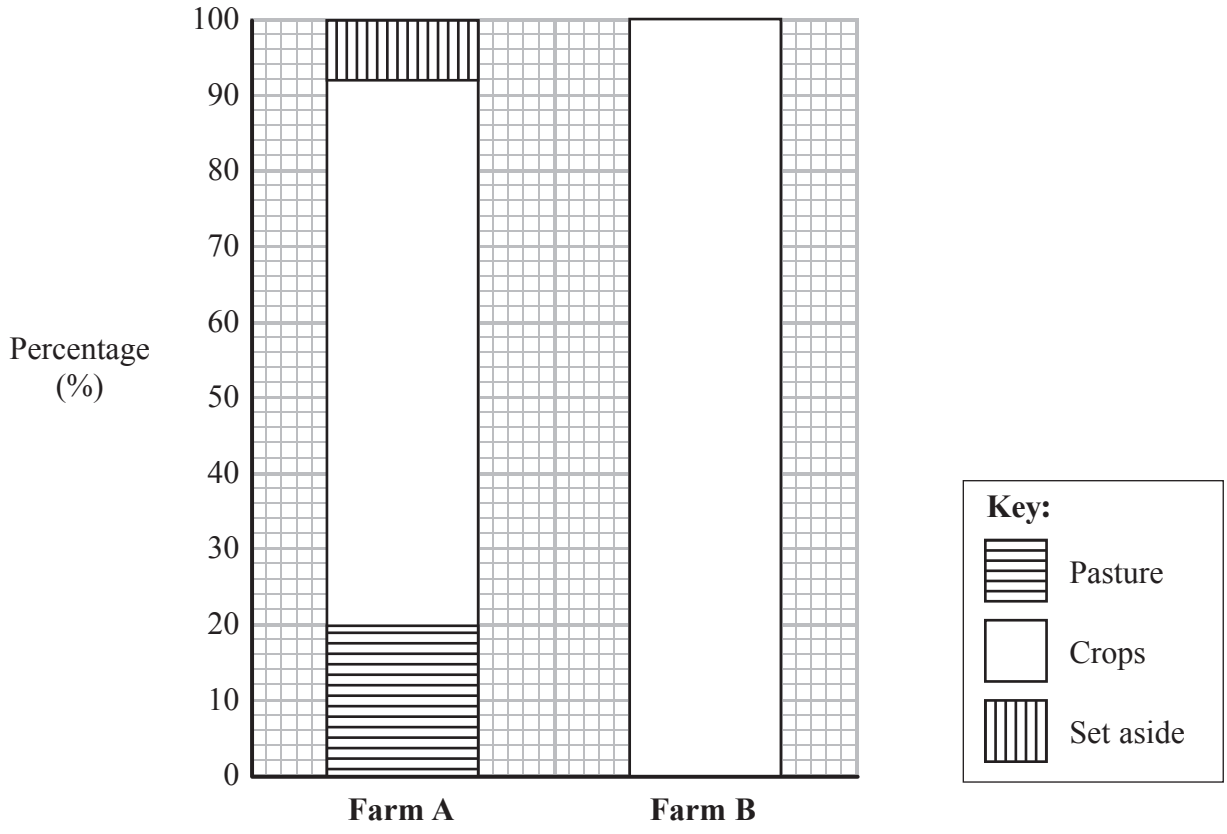
The type of dog is an example of ..... data.

The number of pupils in a classroom is an example of ..... data.

(Total for Question 1 is 2 marks)

2 The incomplete table and composite bar chart show information about the percentages of the land use on two farms, A and B.

	Pasture	Crops	Set aside
Farm A			
Farm B	40%	56%	4%



(a) Use the information from the composite bar chart for Farm A to complete the table.

(3)

(b) Use the information from the table to complete the composite bar chart for Farm B.

(3)

(Total for Question 2 is 6 marks)

3 The two-way table below gives some information about the meals chosen by people visiting a restaurant.

	Pizza	Salad	Pasta	Total
Cake	12	10		25
Ice cream	10		20	40
Fruit	4	2		
Total			24	72

Complete the two-way table.

(Total for Question 3 is 2 marks)

4 A council wants to provide extra parking on an estate.

The council asked a sample of the families on the estate how many cars they have.

Information about the number of cars each family has is shown in the frequency table.

Number of cars	Frequency
0	0
1	10
2	8
3	7

(a) Find the median number of cars.

(2)

(b) Work out the mean number of cars.

(3)

(Total for Question 4 is 5 marks)

5 The table shows information about the weights, in grams, of some oranges.

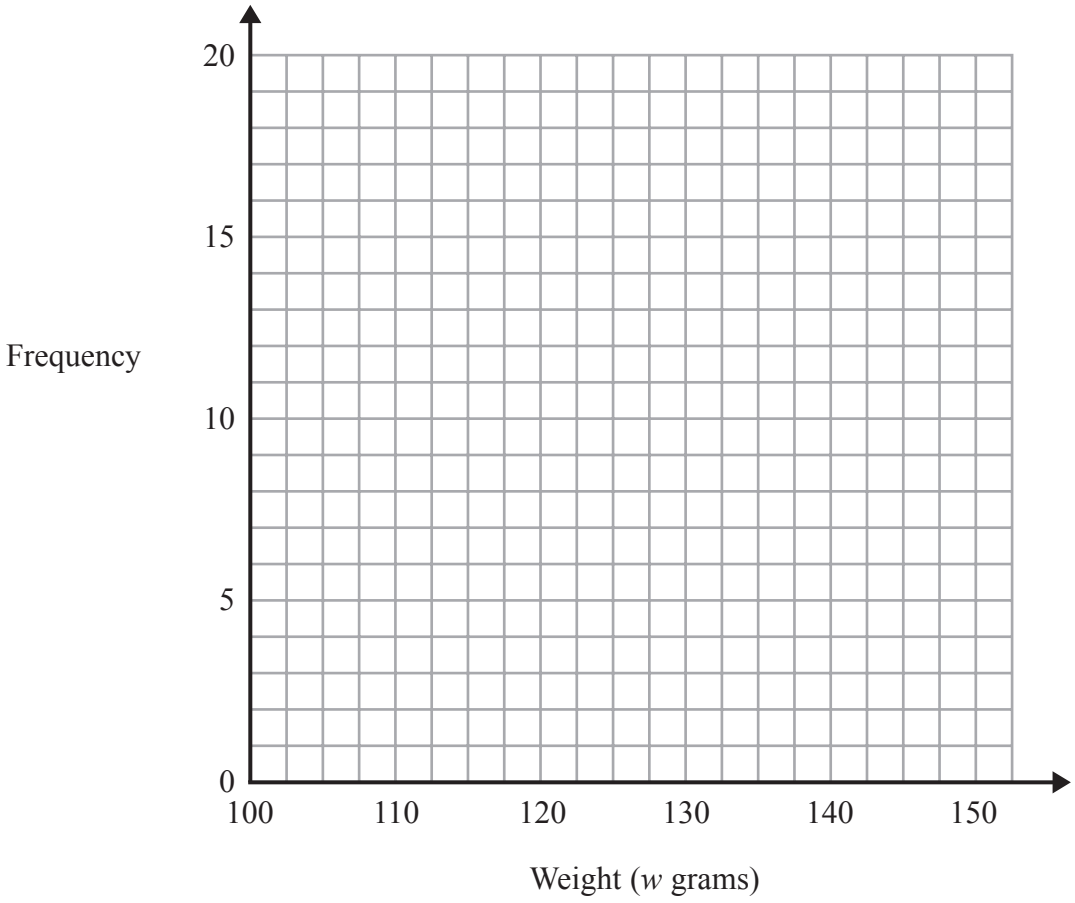
Weight (w grams)	Frequency
$100 < w \leqslant 110$	4
$110 < w \leqslant 120$	8
$120 < w \leqslant 130$	11
$130 < w \leqslant 140$	17
$140 < w \leqslant 150$	5

(a) Write down the modal class interval.

.....

(1)

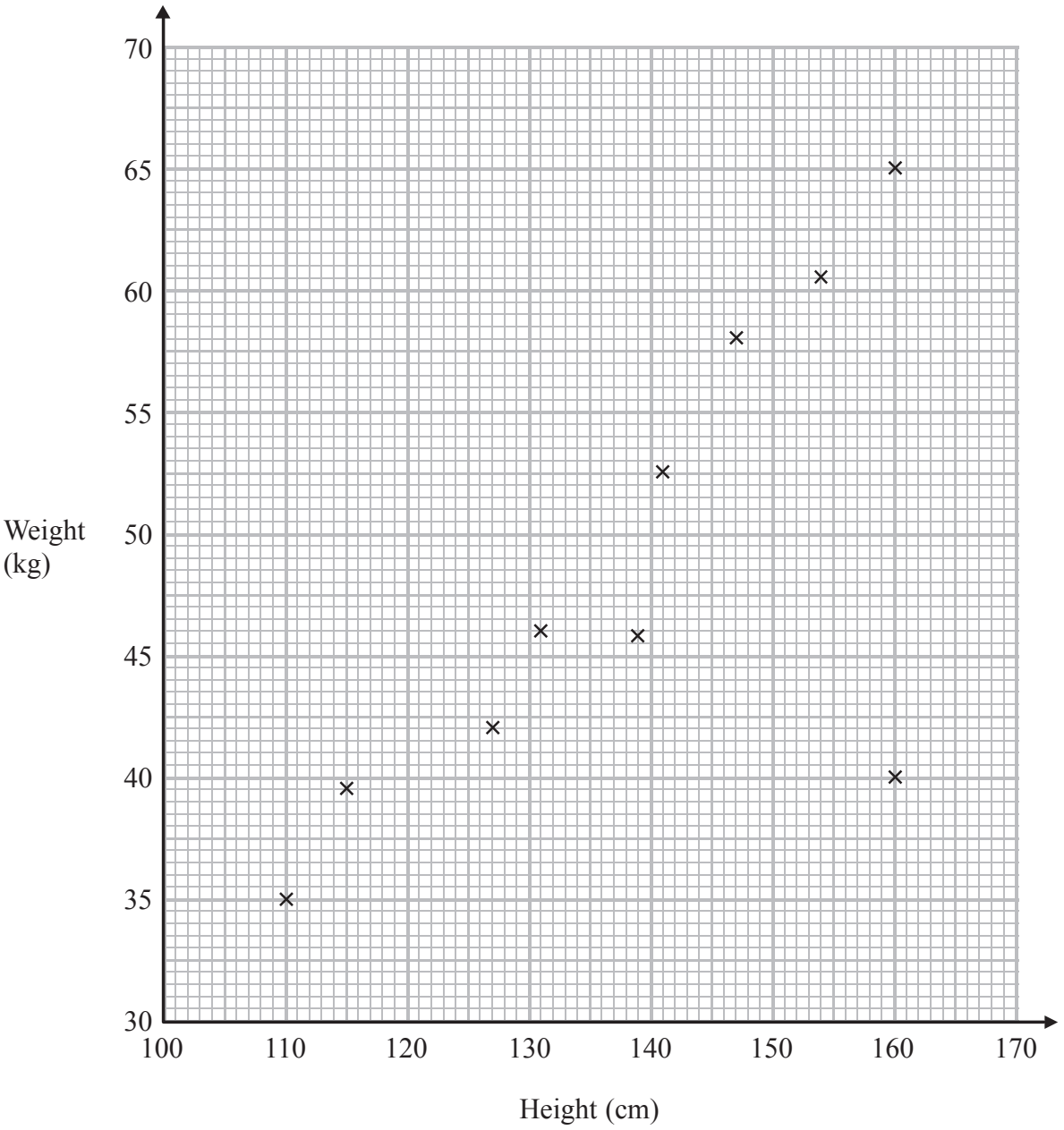
(b) On the grid, draw a frequency polygon for this information.



(2)

(Total for Question 5 is 3 marks)

6 The scatter graph gives information about the height, in cm, and the weight, in kg, of each of 10 children in a class.



(a) What statistical name would you give to the point (160, 40) which does not fit the pattern of the other points?

.....

(1)

(b) Ignoring the point (160, 40), describe the relationship between the height and the weight of these children.

.....

.....

(1)

(c) Ignoring the point (160, 40), draw a line of best fit on the scatter graph.

(1)

Another child in the class is weighed.
The weight of this child is 55 kg.

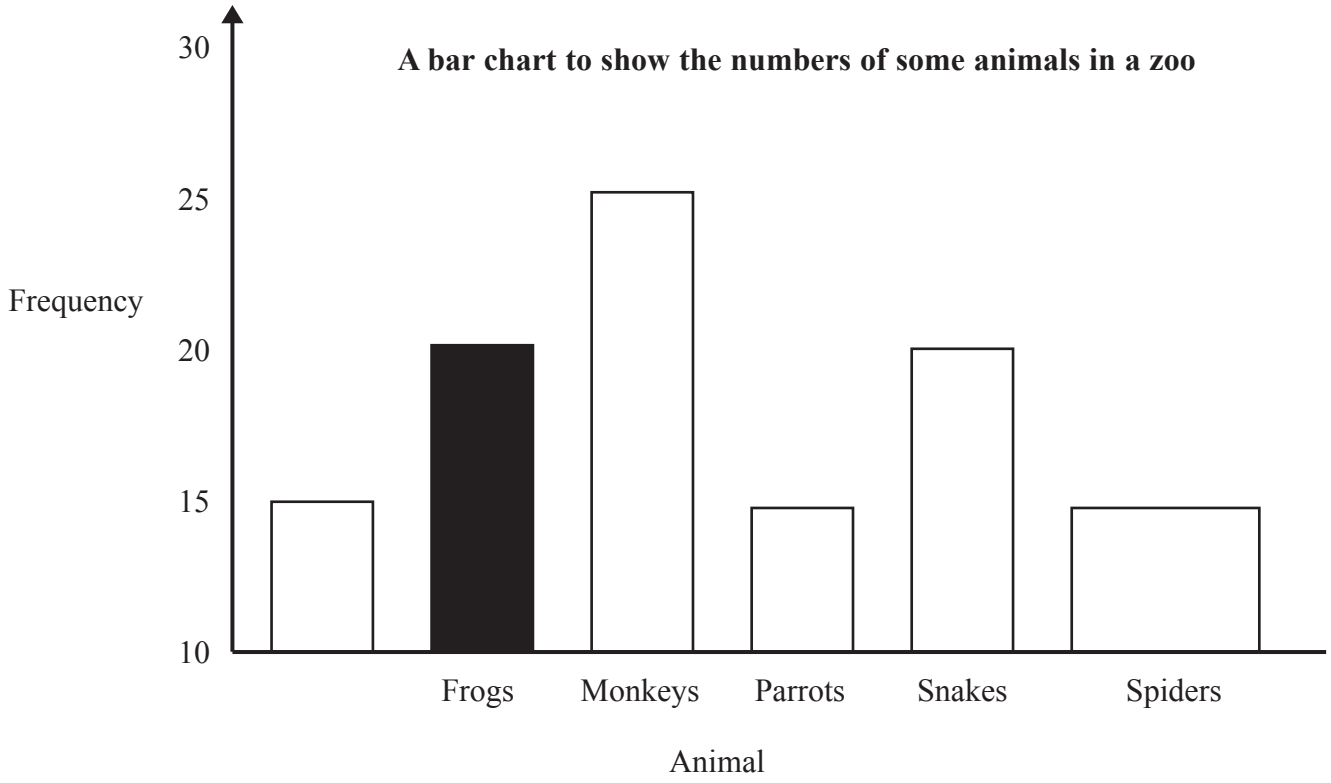
(d) Using your line of best fit, make a prediction for the height of this child.

..... cm

(1)

(Total for Question 6 is 4 marks)

7 Here is a bar chart.



Write down two things that are wrong or could be misleading in the bar chart.

1 .....

.....

2 .....

.....

(Total for Question 7 is 2 marks)

8 Here are the times taken, in minutes, for each of 15 people to complete a crossword puzzle.

34 48 42 35 38 56 34 28 52

18 43 27 60 33 29

(a) Draw an ordered stem and leaf diagram for this information.

(3)

(b) Find the median time taken.

..... minutes

(1)

(c) Work out the interquartile range.

..... minutes

(2)

(Total for Question 8 is 6 marks)

9 Suji has a biased 4-sided spinner.

The spinner can land on 1 or on 2 or on 3 or on 4

The table shows the probabilities that when the spinner is spun, it will land on 1 or on 2 or on 3

Number	**1**	**2**	**3**	**4**
Probability	0.25	0.2	0.1	

Suji spins the spinner once.

(a) Work out the probability that the spinner will land on 2 or on 3

.....

(2)

(b) Work out the probability that the spinner will land on 4

.....

(2)

Suji is going to spin the spinner 500 times.

(c) Work out an estimate for the number of times the spinner will land on 3

.....

(2)

Mary has a fair 4-sided spinner.
Mary's spinner can land on 1 or on 2 or on 3 or on 4
Mary is going to spin her spinner 500 times.

(d) Compare the estimate of the number of times that Suji's spinner will land on 3 with the expected number of times that Mary's spinner will land on 3

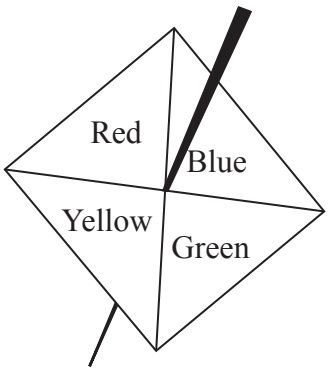
.....

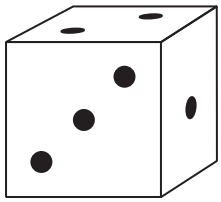
.....

(1)

(Total for Question 9 is 7 marks)

10 Jasmine has a fair 4-sided spinner and a fair 6-sided dice.





The spinner is labelled Red, Blue, Yellow, Green.
The dice is numbered 1, 2, 3, 4, 5, 6

The spinner is spun once and the dice is rolled once.
The incomplete sample space diagram below shows some of the possible outcomes.

		Dice					
		1	**2**	**3**	**4**	**5**	**6**
Spinner	**Red (R)**	(R, 1)	(R, 2)				
	Blue (B)	(B, 1)					
	Yellow (Y)						
	Green (G)						

(a) Complete the sample space diagram.

(2)

(b) Find the probability that the spinner lands on red and the dice lands on an odd number.

.....

(1)

(Total for Question 10 is 3 marks)

11 The manager of a pie shop decides to test the quality of the pies made in the shop.

A sample of the pies is to be tested rather than the population of the pies.

(a) Explain why.

.....

.....

(1)

In one week 5000 pies are made in the shop.

The manager decides to test only the first 5 pies made one day.

This is **not** a good sample.

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

.....

.....

.....

.....

(2)

(Total for Question 11 is 3 marks)

12 Chioma wants to find out how many magazines people have read this month.

She uses this question on a questionnaire.

How many magazines have you read this week?

1 – 2	2 – 4	5 – 6	7 or more
☐	☐	☐	☐

(a) Write down **two** things that are wrong with this question.

.....

.....

.....

.....

(2)

Chioma also wants to find out how long people spend reading each day.

(b) Design a suitable question Chioma could use in her questionnaire.
You must include some response boxes.

(2)

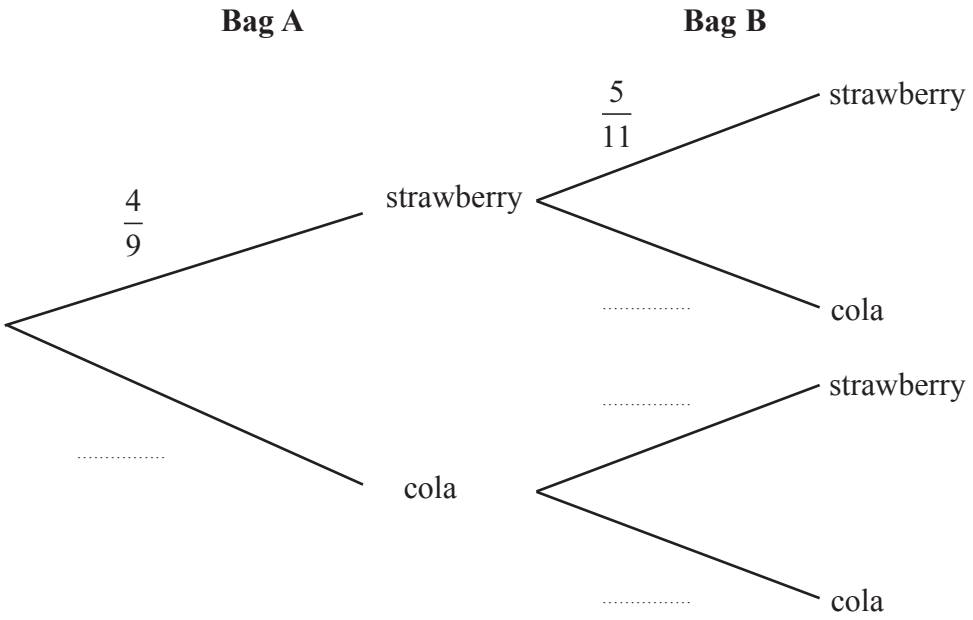
(Total for Question 12 is 4 marks)

13 Bevan has two bags containing sweets.

Bag A contains 4 strawberry flavoured sweets and 5 cola flavoured sweets.
Bag B contains 5 strawberry flavoured sweets and 6 cola flavoured sweets.

Bevan takes at random one sweet from each bag.

(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that the sweet from bag A is strawberry flavoured and the sweet from bag B is strawberry flavoured.

.....

(2)

(c) Work out the probability that neither of the two sweets is strawberry flavoured.

.....

(2)

(Total for Question 13 is 6 marks)

14 The table gives information about the length of time, in minutes, that each of 100 men spent in a shop.

Time (t minutes)	Frequency	
$0 < t \leqslant 10$	18	
$10 < t \leqslant 20$	14	
$20 < t \leqslant 30$	16	
$30 < t \leqslant 40$	24	
$40 < t \leqslant 50$	28	

(a) Find the class interval that contains the median time.

.....

(1)

(b) Calculate an estimate for the mean time.

..... minutes

(4)

(Total for Question 14 is 5 marks)

15 A running club has 200 members.

The club's race distances are 100 m, 200 m, 400 m, 800 m and 1500 m.

Each member was asked to name their preferred race distance.

The table gives information about the number of members who preferred each race distance.

Preferred race distance	Frequency
100 m	63
200 m	51
400 m	39
800 m	27
1500 m	20

Abdul takes a sample of 40 of these members stratified by preferred race distance.

Find the number of members in his sample whose preferred race distance is 400 m.

.....

(Total for Question 15 is 2 marks)

16 Tammy weighed 15 male Great Dane dogs.

She recorded the weight, in kg, of each dog.

Here are her results.

64	68	55	80	82	73	69	84
68	75	81	63	66	84	54	

(a) Find the median.

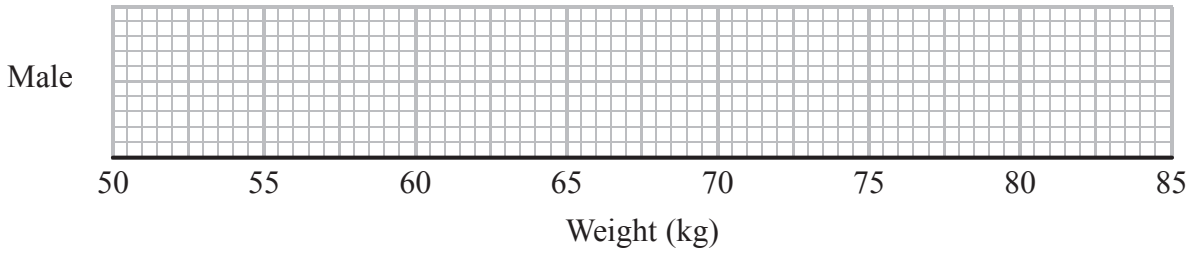
..... kg

(2)

The lower quartile of the weights of the male dogs is 64 kg.

The upper quartile of the weights of the male dogs is 81 kg.

(b) On the grid, draw a box plot for the weights of the male Great Dane dogs.



(2)

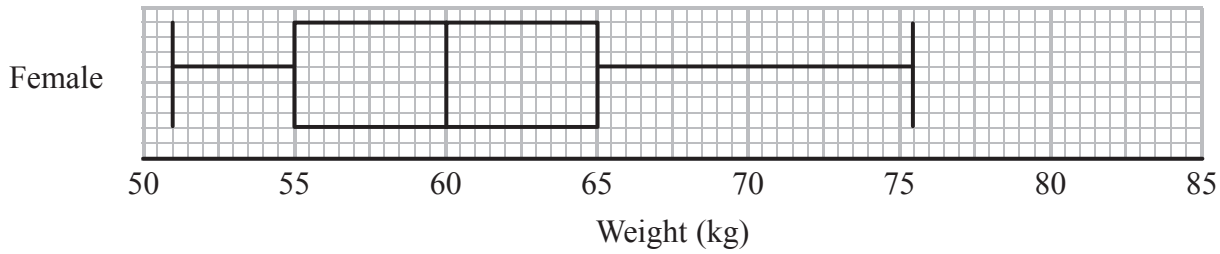
(c) Describe the skew of the distribution of the weights of these male dogs.

.....

(1)

Tammy also recorded the weights of female Great Dane dogs.

The box plot below shows information about the weights of these female dogs.



(d) Compare the distributions of the weights of the male dogs and the weights of the female dogs.
Write down three comparisons.

1 .....

.....

2 .....

.....

3 .....

.....

(3)

(Total for Question 16 is 8 marks)

17 The table shows the number of mobile phones sold each month from August to December in a shop.

Month	August	September	October	November	December
Number of mobile phones sold	70	64	73	85	91

(a) Work out the 3-point moving averages for the information in the table.
The first one has been worked out for you.

69 .....

(2)

(b) Describe what the moving averages show about the trend in the number of mobile phones sold in the shop over these months.

.....

(1)

(c) (i) Taking November as the base month, work out the index number for the number of mobile phones sold in December.
Give your answer correct to 3 significant figures.

.....

(ii) Interpret your index number.

.....

(3)

(Total for Question 17 is 6 marks)

18 $n = 40$
$\sum x = 500$
$\sum x^2 = 6800$

Work out the standard deviation.
Give your answer correct to 3 significant figures.

.....

(Total for Question 18 is 3 marks)

19 55 adults sat an IQ test.

15 men sat the test and had a mean score of 102

40 women sat the test and had a mean score of 108

Calculate the mean score of all 55 adults.

.....

(Total for Question 19 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS