

Write your name here

Surname

Other names

Pearson
Edexcel Award

Centre Number

--	--	--	--	--	--

Candidate Number

--	--	--	--	--

Statistical Methods

Level 2

Calculator allowed

Monday 13 January 2014 – Afternoon

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 ►

P44240A

©2014 Pearson Education Ltd.

5/5/5/5/



PEARSON

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1 Complete the sentences below using one of the following words.

discrete

continuous

categorical

The weight of a dog is data.

The number of eggs in a basket is data.

The colour of a person's hair is data.

(Total for Question 1 is 2 marks)

2 Here are the ages, in years, of 25 people.

22	35	22	28	23
41	26	33	39	32
32	26	18	44	27
19	30	26	39	33
29	38	28	32	34

(a) Complete the grouped frequency table for this information.

Age (years)	Tally	Frequency
$15 < y \leq 20$		
$20 < y \leq 25$		
$25 < y \leq 30$		
$30 < y \leq 35$		
$35 < y \leq 40$		
$40 < y \leq 45$		

(3)

(b) Find the class interval that contains the median.

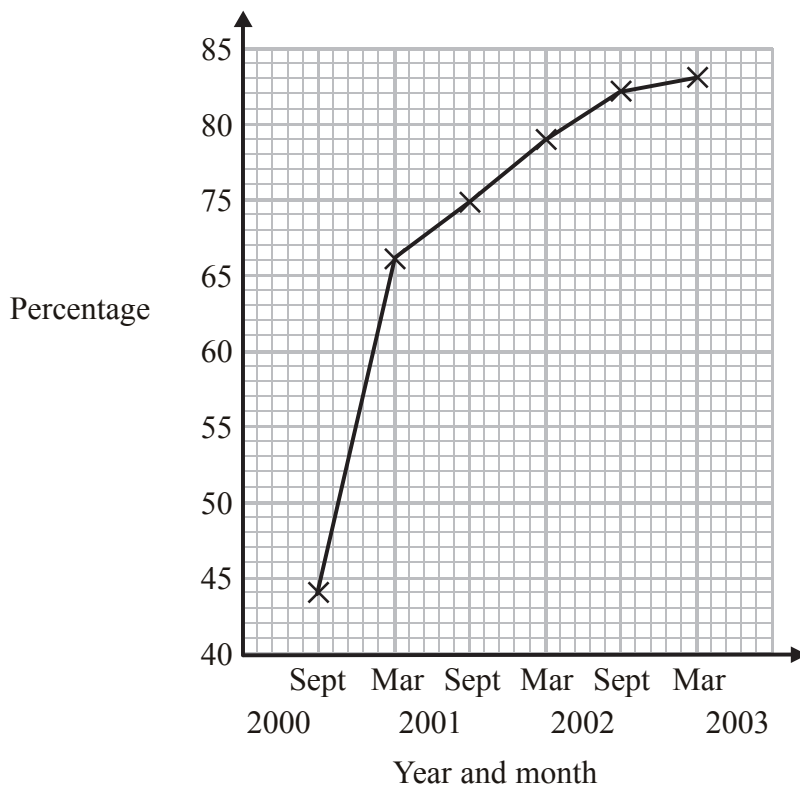
.....
(1)

(Total for Question 2 is 4 marks)



- 3 The time-series graph gives information about the percentage of businesses in the UK using emails.

Percentage of businesses in the UK using emails



The time-series graph is wrong and could be misleading.

Write down two reasons why.

1

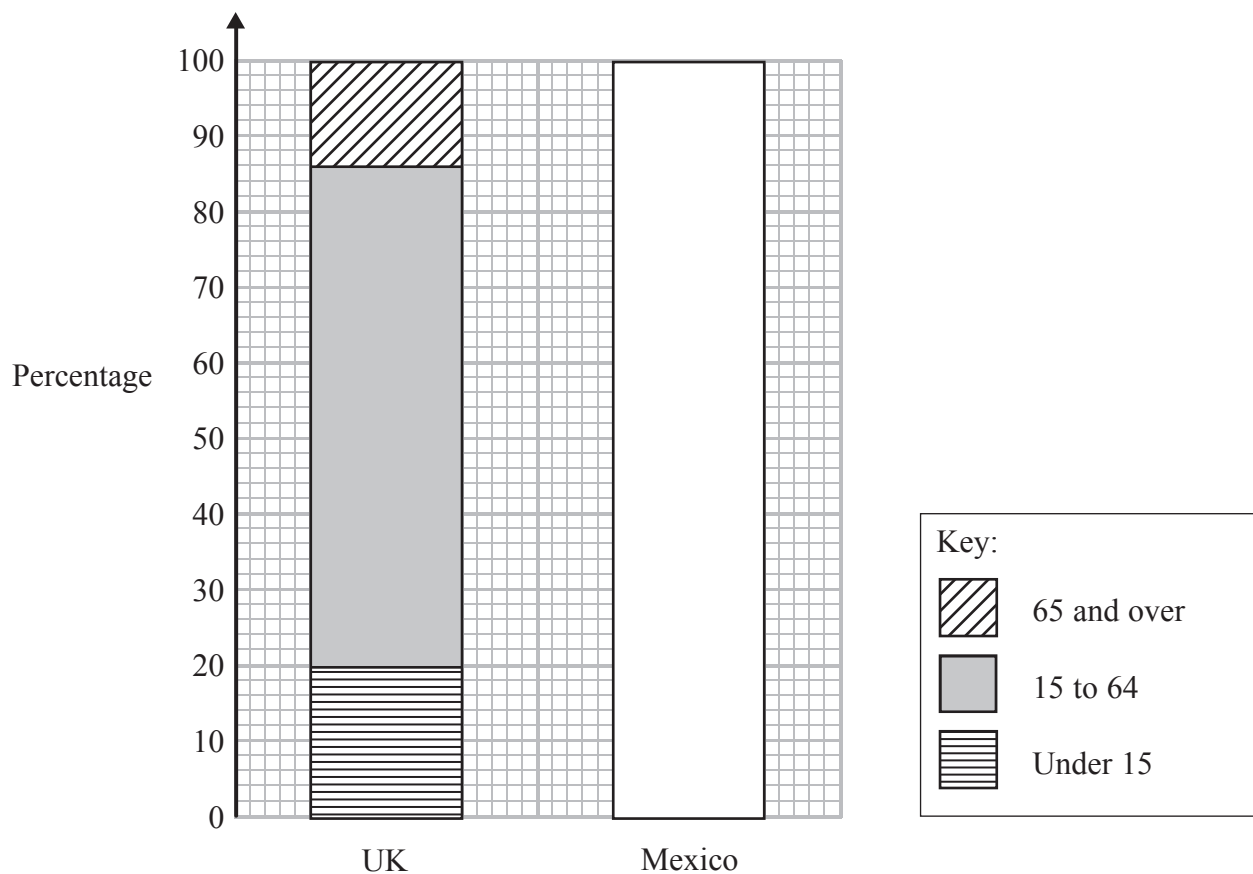
2

(Total for Question 3 is 2 marks)



- 4 The incomplete table and composite bar chart show, for two countries, the percentages of the population in 3 age ranges.

	Under 15	15 to 64	65 and over
UK			
Mexico	36%	60%	4%



- (a) Use the information from the composite bar chart for the UK to complete the table.

(3)

- (b) Use the information from the table to complete the composite bar chart for Mexico.

(3)

(Total for Question 4 is 6 marks)



5 Pam has a 6-sided dice.

The dice is biased.

The table shows the probabilities that when the dice is thrown, it will land on 1 or 2 or 3 or 4 or 5

Number	1	2	3	4	5	6
Probability	0.15	0.25	0.1	0.2	0.15	

Pam throws the dice.

(a) Work out the probability that the dice will land on 6

.....
(2)

(b) Work out the probability that the dice will land on 1 or 3 or 5

.....
(2)

Pam is going to throw the dice 300 times.

(c) Work out an estimate for the number of times the dice will land on 4

.....
(2)

(d) Compare this estimate for the number of times the dice will land on 4 with the expected number of times the dice will land on 4 when the dice is fair.

.....
(1)

(Total for Question 5 is 7 marks)



6 A restaurant offers the following main courses and desserts.

Main Course
Fish and Chips (F)
Spaghetti Bolognese (S)
Jacket Potato and Tuna (J)
Chicken Curry (C)

Dessert
Ice Cream (I)
Apple Pie (P)
Strawberry Yoghurt (Y)

The sample space diagram below shows some of the possible outcomes when one main course and one dessert are chosen.

		Main Course			
		F	S	J	C
Dessert	I	(F, I)	(S, I)		
	P	(F, P)			
	Y				

(a) Complete the sample space diagram.

(2)

Sally is going to pick at random one main course and one dessert.

(b) Find the probability that she picks fish and chips and a strawberry yoghurt.

.....
(1)

(Total for Question 6 is 3 marks)



7 The manager of a factory making candles decides to test the quality of the candles.

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

(a) Explain why.

(1)

5000 candles per day are made in the factory.

The manager decides to test the last 5 candles produced one day.

This is **not** a good sample.

(b) Give two reasons why.

1

2

(2)

(Total for Question 7 is 3 marks)



- 8 Aarti wants to find out how many text messages people send on their mobile phone. She uses this question on a questionnaire.

How many text messages do you send on your mobile phone?			
1 – 10	10 – 20	20 – 30	30 – 40
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- (a) Write down two things wrong with this question.

1.....

2.....

(2)

Aarti also wants to find out how much time people spend making phone calls on their mobile phones.

- (b) Design a suitable question Aarti could use for her questionnaire. You must include some response boxes.

(2)

(Total for Question 8 is 4 marks)

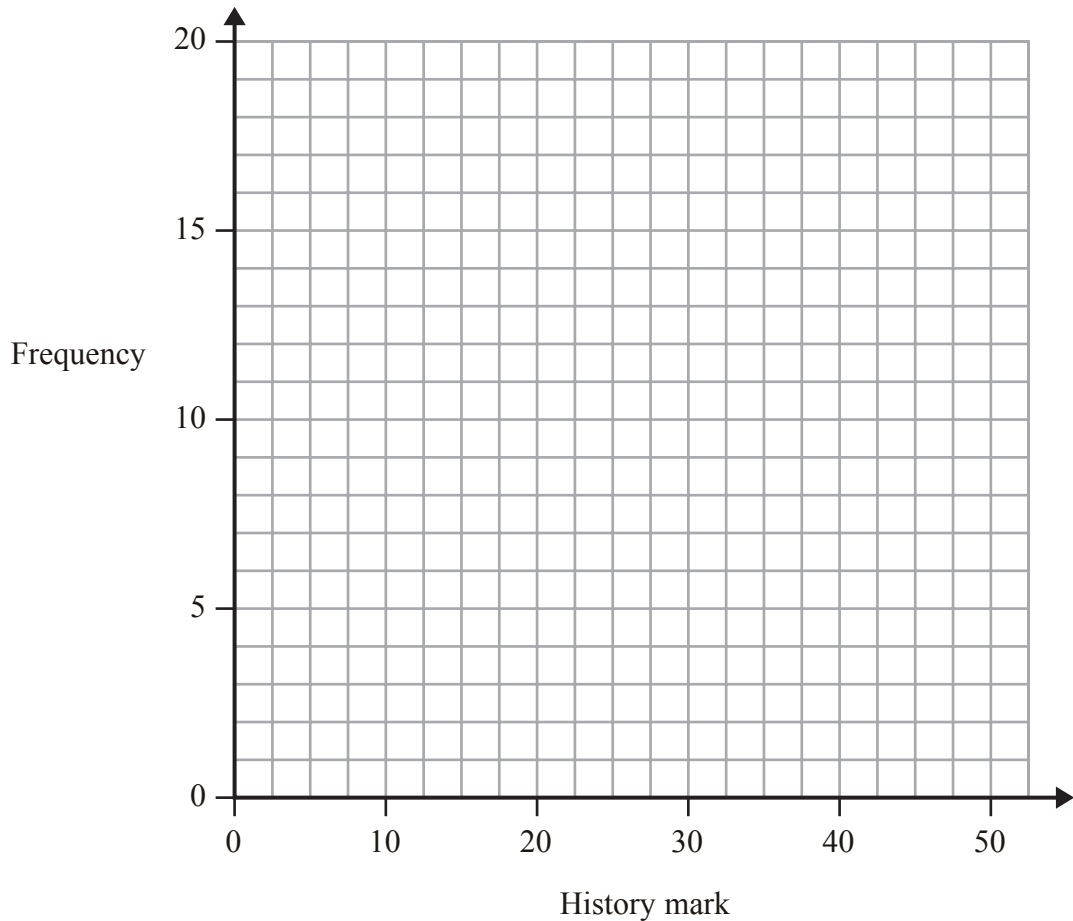


- 9 60 students take a history test.
The test is marked out of 50

This table shows information about the students' marks.

History mark (m)	$0 < m \leq 10$	$10 < m \leq 20$	$20 < m \leq 30$	$30 < m \leq 40$	$40 < m \leq 50$
Frequency	2	11	15	17	5

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



(2)

- (b) Write down the modal class interval.

.....
(1)

(Total for Question 9 is 3 marks)



10 20 students scored goals for a school football team last month.

The table gives information about the number of goals scored by each student.

Goals scored	Number of students	
1	9	
2	3	
3	5	
4	3	

(a) Work out the median number of goals scored.

.....
(2)

(b) Work out the range of the number of goals scored.

.....
(1)

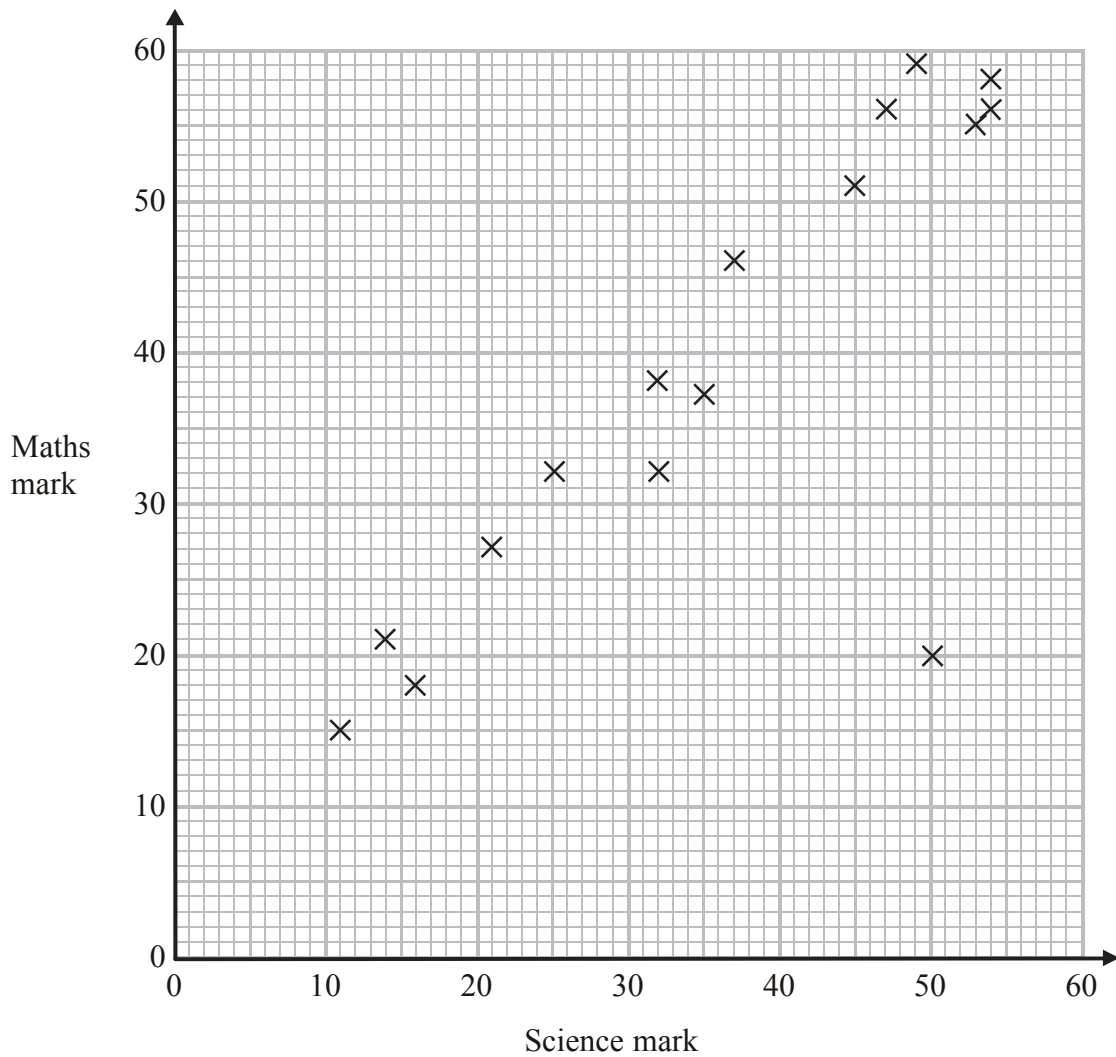
(c) Work out the mean number of goals scored.

.....
(3)

(Total for Question 10 is 6 marks)



11 The scatter graph shows the science mark and the maths mark for 16 students.



(a) What name would you give to the point (50, 20) which does not fit the pattern of the other points?

(1)

(b) Describe the relationship between the mark in science and the mark in maths.

(1)

(c) Draw a line of best fit on the scatter graph.

(1)

Sophina's science mark was 30

(d) Use your line of best fit to find an estimate for Sophina's maths mark.

(1)

(Total for Question 11 is 4 marks)



P 4 4 2 4 0 A 0 1 1 2 0

12 Robyn recorded the heights, in centimetres, of the girls in her class.

Here are her results.

132 144 150 152 160 162 162 167
167 170 172 177 181 182 182

(a) (i) Find the median.

..... cm

(ii) Find the lower quartile.

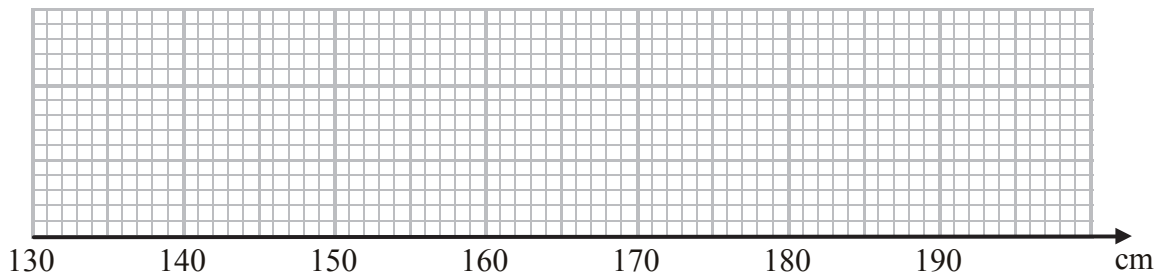
..... cm

(iii) Find the upper quartile.

..... cm

(3)

(b) On the grid, draw a box plot for Robyn's results.



(3)

(c) Describe the skew of the distribution of the heights.

.....
(1)

(Total for Question 12 is 7 marks)



13 The following table shows the value of a house in Ockendon for the years 1990 and 1991.

Ockendon

Year	1990	1991
Value (£)	£80 000	£88 000

(a) Taking 1990 as the base year, work out the value of the house in Ockendon in 1991 as an index number.

.....
(2)

Using 1990 as the base year, the value of a house in Tilbury in 1991 as an index number is 108.5

(b) Interpret and compare the index numbers for Ockendon and Tilbury in 1991.

.....
.....
(2)

(Total for Question 13 is 4 marks)



14 The table shows information about the numbers of shoes sold in a shop.

Year	Quarter	Number of Shoes
2010	1	255
	2	309
	3	285
	4	243
2011	1	294
	2	330

(a) Calculate the 4-point moving averages for this information.

.....
(2)

(b) Describe what the moving averages show about the trend in the numbers of shoes sold in the shop over this period of time.

.....
(1)

(Total for Question 14 is 3 marks)



15 Amy found out the length of reign of each of 36 queens.

She used the information to complete the following frequency table.

Length of reign (t years)	Number of queens		
$0 < t \leq 10$	13		
$10 < t \leq 20$	12		
$20 < t \leq 30$	7		
$30 < t \leq 40$	3		
$40 < t \leq 50$	1		

Calculate an estimate for the mean.

..... years

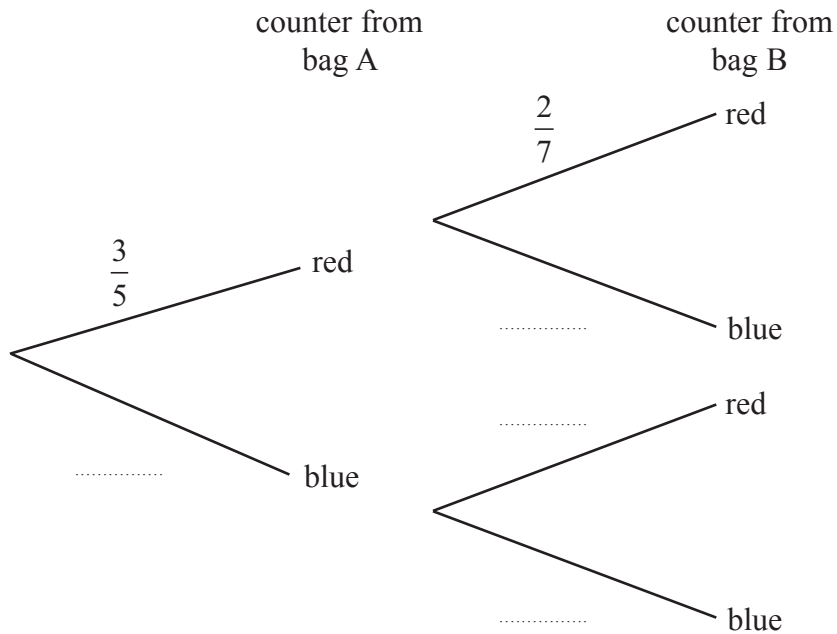
(Total for Question 15 is 4 marks)



16 Natalie has two bags.
 Bag A contains 3 red counters and 2 blue counters.
 Bag B contains 2 red counters and 5 blue counters.

Natalie takes at random one counter from each bag.

(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that the counter from bag A is red and the counter from bag B is blue.

.....
 (2)

(c) Work out the probability that the counter from bag A and the counter from bag B are the same colour.

.....
 (2)

(Total for Question 16 is 6 marks)



17 A school has 650 students.

Each student studies one of Latin, Japanese, French and Spanish.

The table shows the number of students who study each of these languages.

Language	Number of students
Latin	145
Japanese	121
French	195
Spanish	189

Peter takes a sample of 50 of these students stratified by the language studied.

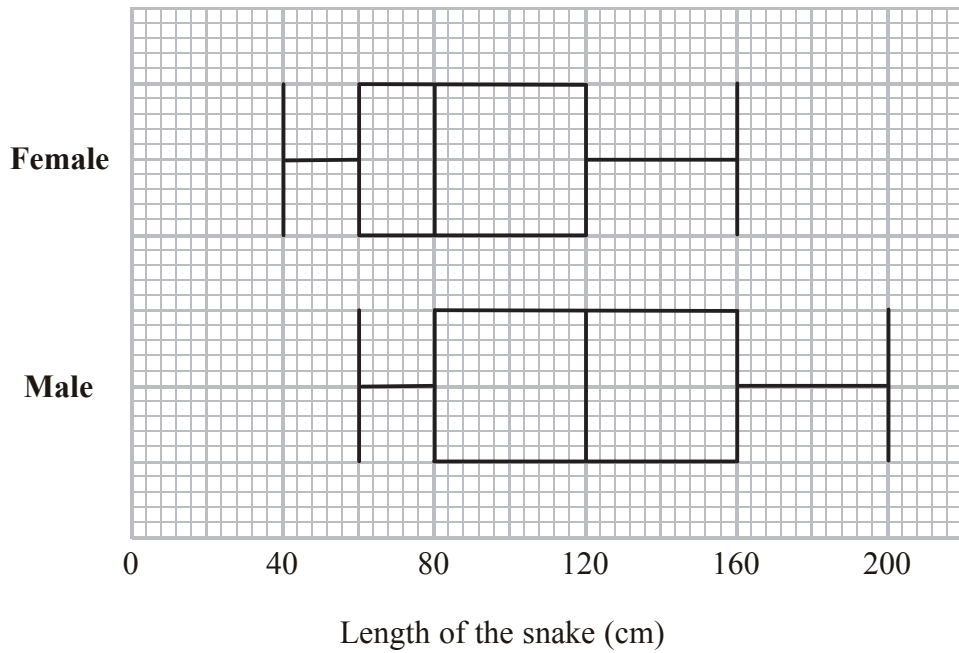
Find the number of students in his sample who study French.

.....
(Total for Question 17 is 2 marks)



18 Bob takes a random sample of the lengths of male and female corn snakes. He measures the length of the snake to the nearest cm.

The box plots summarise his results.



Compare the distributions of the lengths of male and female snakes. Write down three comparisons.

- 1.....
-
-
-
- 2.....
-
-
-
- 3.....
-
-
-

(Total for Question 18 is 3 marks)



19 $n = 20$

$$\sum x = 240$$

$$\sum x^2 = 3000$$

Work out the standard deviation.

Give your answer correct to 3 decimal places.

.....
(Total for Question 19 is 3 marks)



20 The mean of eight numbers is 41
The mean of two of the numbers is 29
What is the mean of the other six numbers?

.....
(Total for Question 20 is 4 marks)

TOTAL FOR PAPER IS 80 MARKS

