Write your name here

Surname		Other names

Centre Number

Candidate Number

Statistical Methods
Level 2
Calculator allowed

Wednesday 13 May 2015 – Morning	Paper Reference
Time: 1 hour 30 minutes	**AST20/01**

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

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 ▶

PEARSON

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1   There are 15 people in a choir.

Their ages, in years, are

12	15	13	17	14
16	15	16	12	15
13	14	16	15	12

(a) Find the range of these ages.

.... years

(2)

(b) Find the mean of these ages.
    Give your answer to 1 decimal place.

.... years

(2)

(Total for Question 1 is 4 marks)

2 The table shows some statements about data.
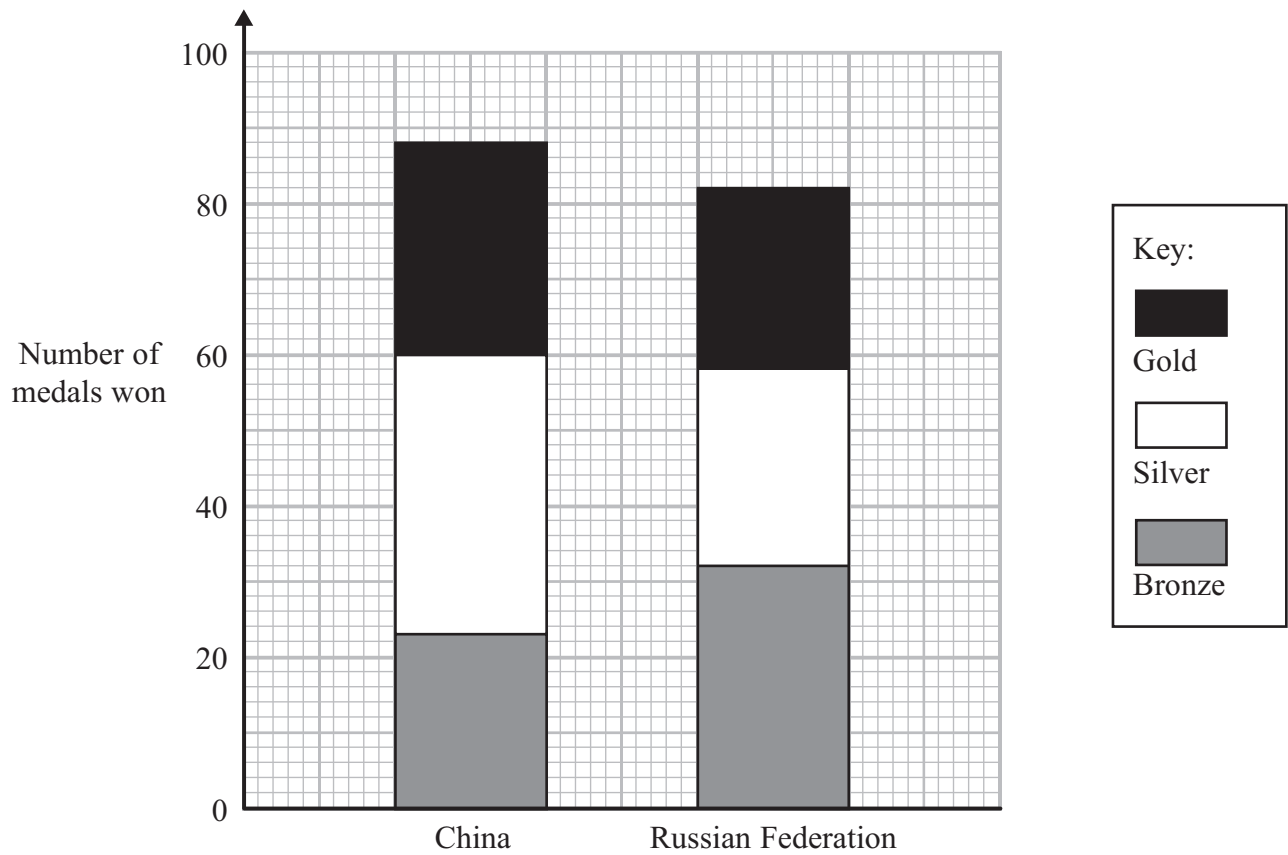
Place a tick in the appropriate column for each statement to show whether the statement refers to **discrete** data or **continuous** data or **categorical** data.

Statement	Discrete	Continuous	Categorical
The colour of a car			
The number of peas in a pod			
The length of a pencil			

(Total for Question 2 is 2 marks)

3   The composite bar chart shows information about the numbers of medals won by two
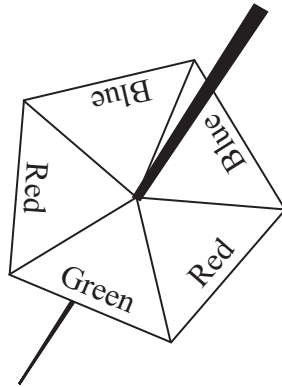   countries in the 2012 Olympic Games.

Use the composite bar chart to complete the table.

	Gold	**Silver**	**Bronze**
China			
Russian Federation			

(Total for Question 3 is 3 marks)

4 Solomon has a fair 5-sided spinner.

The spinner has 2 red sides, 1 green side and 2 blue sides.
Solomon is going to spin the spinner once.

(a) Write down the probability that the spinner will land on blue.

....
(1)

Solomon is going to spin the spinner 400 times.

(b) Work out an estimate for the number of times the spinner will land on blue.

....
(2)

Solomon's sister spins the spinner 20 times.

(c) Explain why the spinner might not land on green exactly 4 times.

....

....

....
(1)

(Total for Question 4 is 4 marks)

5 Here are the weights, in grams, of 40 bananas.

102	113	124	128	135	105	133	141	128	123
125	118	112	109	125	134	138	128	124	130
142	136	129	108	118	123	126	124	132	134
117	125	118	126	116	135	117	136	128	132

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

Weight (g grams)	Tally	Frequency
$100 < g \leqslant 110$		
$110 < g \leqslant 120$		
$120 < g \leqslant 130$		
$130 < g \leqslant 140$		
$140 < g \leqslant 150$		

(2)

(b) On the grid, draw a frequency polygon for the information in your table.

(2)

(Total for Question 5 is 4 marks)

6 Mark wants to find out how long it takes people in his town to travel to work.
He will use a questionnaire.

(a) Design a suitable question for Mark to use in his questionnaire.
You must include some response boxes.

(2)

Mark decides to use a sample of the people that live in his town rather than the population.

(b) Explain why Mark would do this.

....

....

(1)

Mark is going to give the questionnaire to a sample of 10 people waiting for a bus on Monday morning.

(c) Write down **two** reasons why this may not be a good sample.

....

....

....

....

(2)

(Total for Question 6 is 5 marks)

7 The ace, king, queen and jack of spades are put in a pile on a table.
The ace, king, queen and jack of hearts are put in another pile on the table.

A card is to be taken at random from each of the two piles.

The sample space diagram shows some of the possible outcomes.

		Hearts			
		Ace (A)	King (K)	Queen (Q)	Jack (J)
Spades	**Ace (A)**	(A, A)			
	King (K)	(K, A)			
	Queen (Q)	(Q, A)	(Q, K)		
	Jack (J)	(J, A)	(J, K)	(J, Q)	

(a) Complete the sample space diagram to show all possible outcomes.

(2)

One card is taken at random from each pile.

(b) Find the probability that

(i) both cards are aces,

....

(ii) at least one of the cards is a king.

....

(3)

(Total for Question 7 is 5 marks)

8 Sally recorded the number of minutes patients had to wait to see the doctor during one morning at a doctor's surgery.

Here are her results.

10	5	23	8	14	16	3	12
22	7	15	18	23	30	20	

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

(3)

(b) Find the median length of time.

....minutes

(1)

(c) Work out the interquartile range.
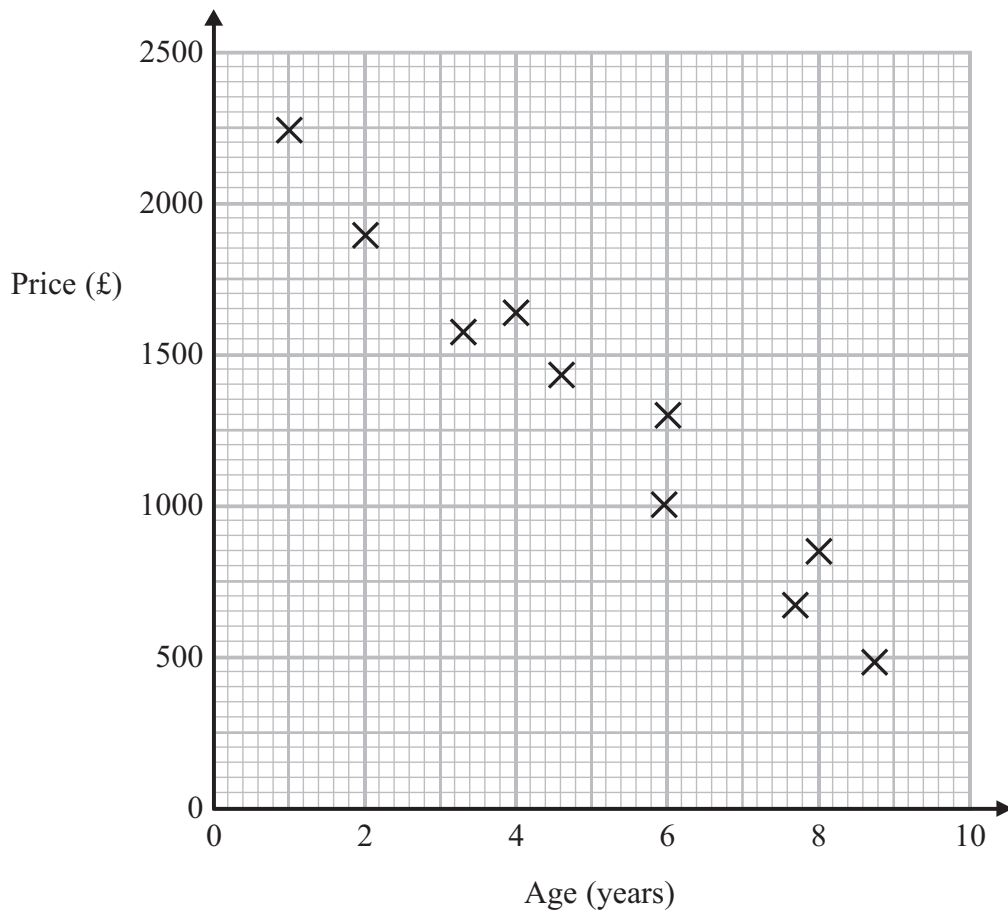
....minutes

(2)

(Total for Question 8 is 6 marks)

9 The scatter graph shows information about the prices and ages of the motorcycles sold by a garage.

(a) Describe the relationship between the price of a motorcycle and its age.

....

(1)

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

(1)

Billy buys a motorcycle from this garage for £1500
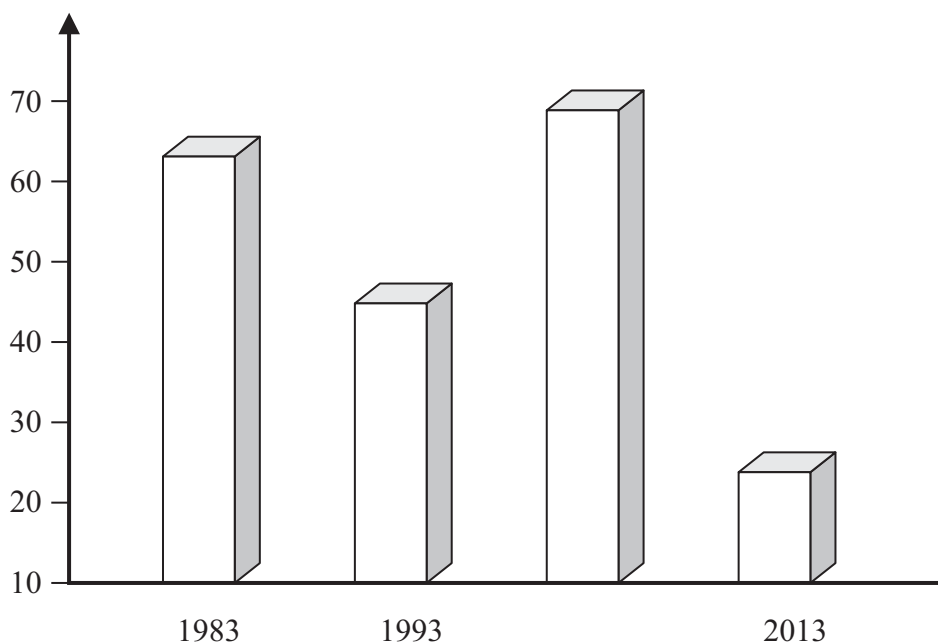
(c) Estimate the age of the motorcycle.

....years

(1)

(Total for Question 9 is 3 marks)

10 The diagram shows the average score of Australia's top seven cricket batsmen.

Write down **two** reasons why this diagram could be wrong or misleading.

....

....

....

....

....
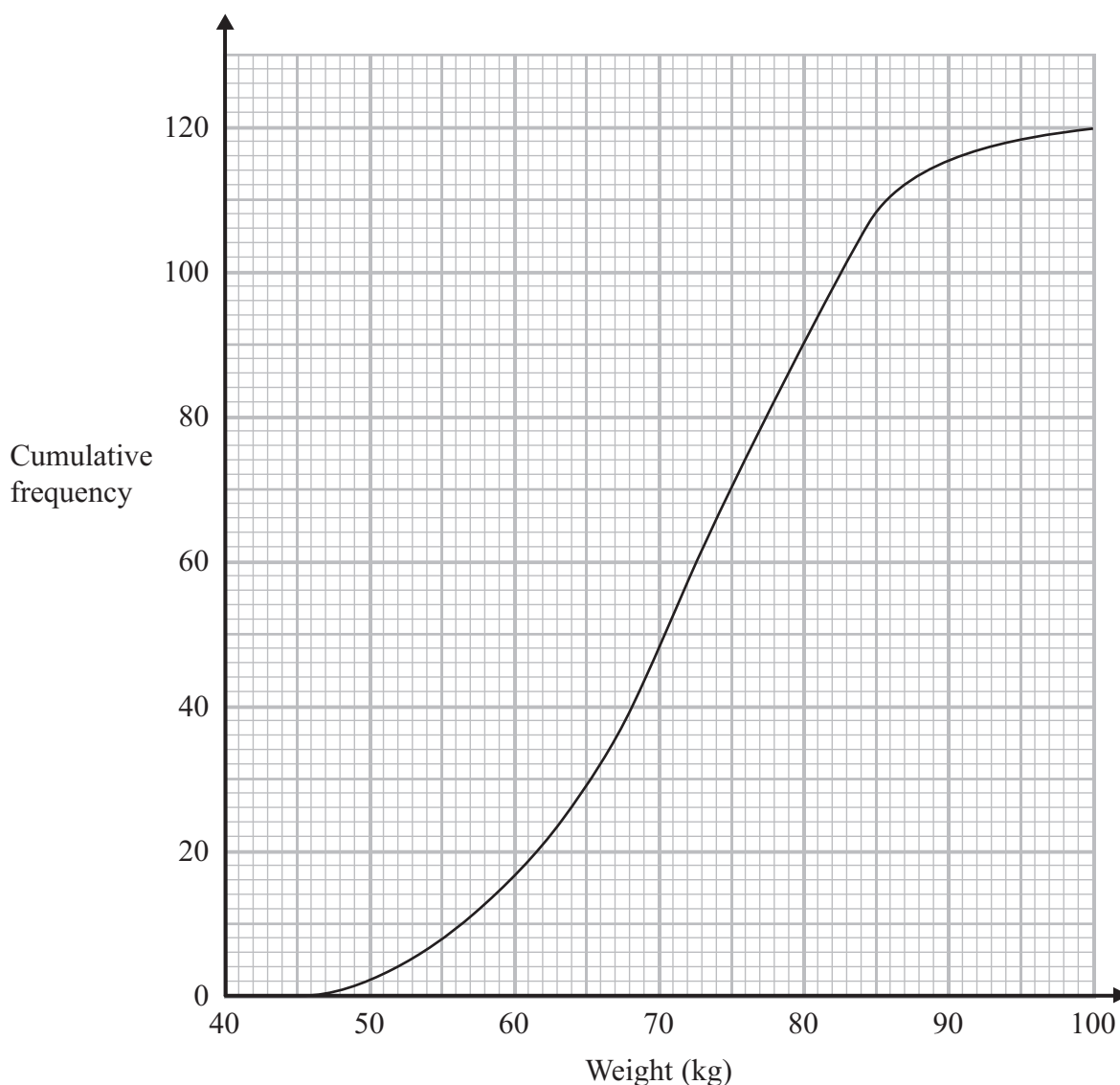
(Total for Question 10 is 2 marks)

11 66 people were asked if they read a newspaper every day.
30 of the people asked were men.
27 women said that they read a newspaper every day.
23 men said that they did not read a newspaper every day.

Using this information, draw a complete two-way table.

(Total for Question 11 is 3 marks)

12 The cumulative frequency diagram gives information about the weights of 120 kangaroos.

Use the cumulative frequency diagram to find an estimate for

(i) the median weight,

....kg

(ii) the number of kangaroos that weigh between 70 kg and 90 kg.

....

(Total for Question 12 is 3 marks)

P 4 4 9 5 6 A 0 1 3 2 0

13 The table shows the number of laptops sold in a shop in each of the first five months of 2012.

Month	January	February	March	April	May
Number of laptops	2190	2220	2280	2250	2280

(a) Work out the 3-point moving averages for the first five months of 2012.

....

(2)

The 3-point moving average of the number of laptops sold in April, May and June of 2012 was 2300

(b) Work out the number of laptops sold in June 2012.

....

(2)

(c) Describe what the moving averages show about the trend in the number of laptops sold in the shop in the first six months of 2012.

....

(1)

(Total for Question 13 is 5 marks)

14 Gina recorded the times, in minutes, taken to cook her last 40 meals.

The table shows information about these times.

Time (t minutes)	Frequency
$20 < t \leqslant 25$	9
$25 < t \leqslant 30$	4
$30 < t \leqslant 35$	4
$35 < t \leqslant 40$	8
$40 < t \leqslant 45$	15

(a) Write down the modal class interval.

....
(1)

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

....
(1)

(c) Calculate an estimate for the mean time taken by Gina to cook these meals.

.... minutes
(4)

(Total for Question 14 is 6 marks)

15 The table shows information about the members of a rugby club.

Age range (years)	Number of people
Under 18	66
18 to 40	95
Over 40	19

The club secretary carries out a survey of the members.
He takes a sample of 30 of these members stratified by age.

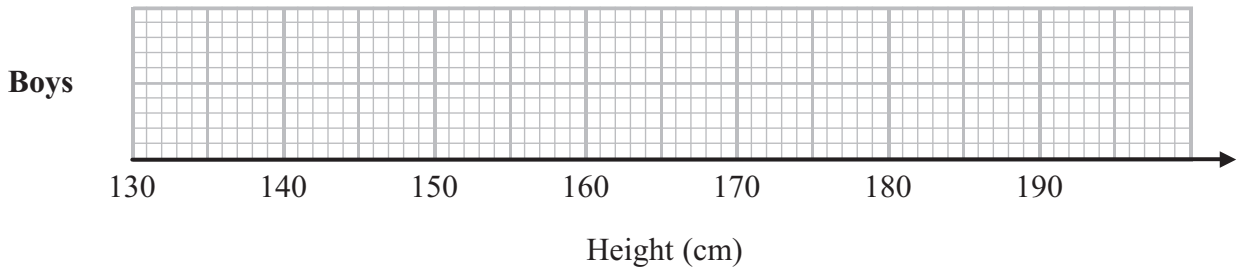Find the number of people in his sample that are aged under 18

....

(Total for Question 15 is 2 marks)

16 Kunle records the heights of boys that attend his local youth club.
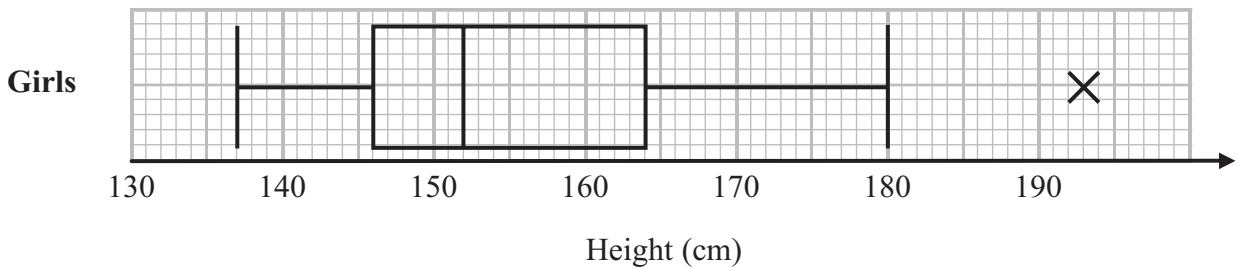
The height of the shortest boy is 142 cm.
The height of the tallest boy is 183 cm.
The median is 164 cm.
The upper quartile is 170 cm.
The interquartile range is 14 cm.

(a) On the grid, draw a box plot for the heights of the boys at Kunle's youth club.

Boys

130   140   150   160   170   180   190

Height (cm)

(3)

The box plot below shows information about the heights of the girls at Kunle's youth club.

Girls

130   140   150   160   170   180   190

Height (cm)

(b) What is the name given to the point represented by the cross in this box plot?

....

(1)

(c) Compare the distributions of the heights of the boys and the heights of the girls.
Write down three comparisons.

1 ....

....

2 ....

....

3 ....

....

(3)

(Total for Question 16 is 7 marks)

17 There are two fish tanks in a pet shop.

Two fish are taken, one at random from tank A and one at random from tank B.

For tank A, the probability of taking a black fish is $\dfrac{3}{5}$

For tank B, the probability of taking a black fish is $\dfrac{5}{8}$

(a) Show this information on a probability tree diagram.

(3)

(b) Work out the probability that both fish will be black.

....

(2)

(c) Work out the probability that only one of the two fish will be black.

....

(3)

(Total for Question 17 is 8 marks)

18 60 people visited a supermarket.

40 of these people were women.
20 of these people were men.

The mean amount of money spent by the women was £105
The mean amount of money spent by the men was £85

Calculate the mean amount of money spent by all 60 people.

£.......................................

(Total for Question 18 is 3 marks)

19 Some tigers were weighed.
The mean weight of the tigers was 230 kg.

x kg represents the weight of a tiger where $\sum x = 3450$

(a) Work out how many tigers were weighed.

....

(2)

$\sum x^2 = 841\,250$

(b) Work out the standard deviation.

....kg

(3)

(Total for Question 19 is 5 marks)

TOTAL FOR PAPER IS 80 MARKS