Write your name here

Surname	Other names

Pearson Edexcel GCSE

Centre Number | | | | | |

Candidate Number | | | | |

Mathematics B

Unit 1: Statistics and Probability (Calculator)

Higher Tier

Wednesday 4 November 2015 – Morning
Time: 1 hour 15 minutes

Paper Reference
5MB1H/01

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

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 60
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed.

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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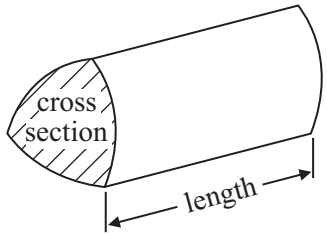
PEARSON

GCSE Mathematics 2MB01

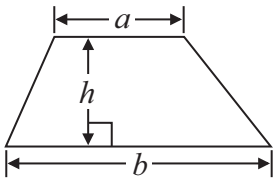
Formulae: Higher Tier

You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.

Volume of prism = area of cross section × length

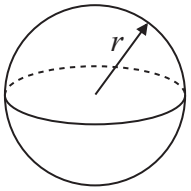


Area of trapezium = $\frac{1}{2}(a + b)h$



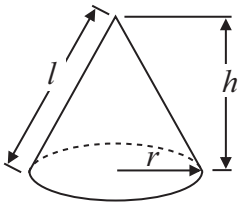
Volume of sphere = $\frac{4}{3}\pi r^3$

Surface area of sphere = $4\pi r^2$

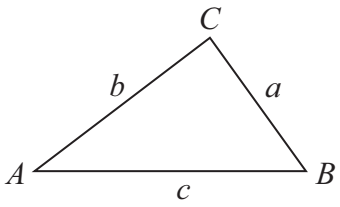


Volume of cone = $\frac{1}{3}\pi r^2 h$

Curved surface area of cone = πrl



In any triangle *ABC*



The Quadratic Equation
The solutions of $ax^2 + bx + c = 0$ where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$

Sine Rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine Rule $a^2 = b^2 + c^2 - 2bc \cos A$

Area of triangle = $\frac{1}{2}ab \sin C$

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1 An electronic game can show red or blue or green or yellow.

The table shows the probabilities that the colour shown will be red or will be green or will be yellow.

Colour	red	blue	green	yellow
Probability	0.15		0.41	0.24

Arthur plays the game.

(a) Work out the probability that the colour shown will be blue.

.....

(2)

Janice is going to play the game 50 times.

(b) Work out an estimate for the number of times the colour shown will be yellow.

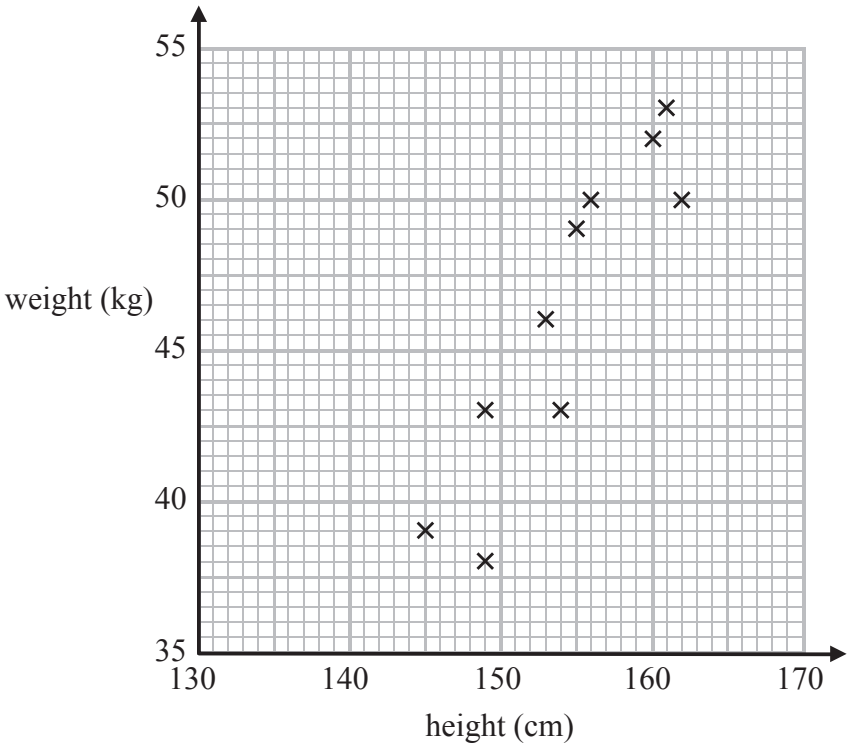
.....

(2)

(Total for Question 1 is 4 marks)

2 Leon recorded the height, in cm, and the weight, in kg, of each of ten students.

The scatter graph shows information about his results.



A different student has a height of 146 cm and a weight of 41 kg.

(a) Plot this information on the scatter graph.

(1)

(b) Describe the relationship between the height and the weight of these students.

.....

(1)

A student has a weight of 47.5 kg.

(c) Use the scatter graph to estimate the height of this student.

..... cm

(2)

(Total for Question 2 is 4 marks)

3 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.

.....

(Total for Question 3 is 4 marks)

4 Mr and Mrs Jones are planning a trip to Colwyn for a day.
There will be two adults and three children on the trip.

They are going from Crewe.
They must be back in Crewe by 7.30 pm.

They buy the cheapest possible tickets for the day trip.

A child ticket is 30% of the price of an adult ticket.

The tables show part of the train timetable between Crewe and Colwyn.
They also show the price of an adult ticket.

Crewe	0723	0823	0849	0923	0949	1023	1049
Colwyn	0850	0943	1016	1034	1104	1148	1200
Price per adult	£25.20	£25.20	£25.20	£25.20	£25.20	£24.00	£24.00

Colwyn	1527	1646	1737	1832	1853	1925	1951
Crewe	1654	1754	1918	1954	2018	2038	2129
Price per adult	£22.00	£22.00	£22.00	£22.00	£18.50	£18.50	£18.50

The family want to be in Colwyn for as long as possible.

*(a) Plan a schedule for the day trip.
You must show the times of both their train journeys.
Write down how long they can spend in Colwyn.

(4)

A child ticket is 30% of the price of an adult ticket.

(b) Calculate the total cost of the train tickets for the Jones family.

£.....

(3)

(Total for Question 4 is 7 marks)

5 Alice wants to find out how many litres of petrol people buy.

She writes this question for a questionnaire.

How much petrol do you buy?

☐ 0–5 ☐ 5–10 ☐ 10–15

Write down **two** things wrong with this question.

1 .....

.....

2 .....

.....

(Total for Question 5 is 2 marks)

6 Ken is x years old.
Liam is $(x + 4)$ years old.
Tina is $3x$ years old.

Write an expression, in terms of x, for the mean of their ages.

.....

(Total for Question 6 is 2 marks)

7 Franz invests £2500 for 2 years at $3\frac{1}{2}$% per annum compound interest.

Work out the value of his investment at the end of 2 years.

£.....

(Total for Question 7 is 3 marks)

8 The table shows information about the number of years 41 teachers have each taught at a school.

Number of years (n)	Number of teachers		
$0 < n \leqslant 10$	14		
$10 < n \leqslant 20$	13		
$20 < n \leqslant 30$	8		
$30 < n \leqslant 40$	4		
$40 < n \leqslant 50$	2		

(a) Write down the class interval that contains the median.

.....

(2)

(b) Calculate an estimate for the mean number of years.
You must show all your working.

.....

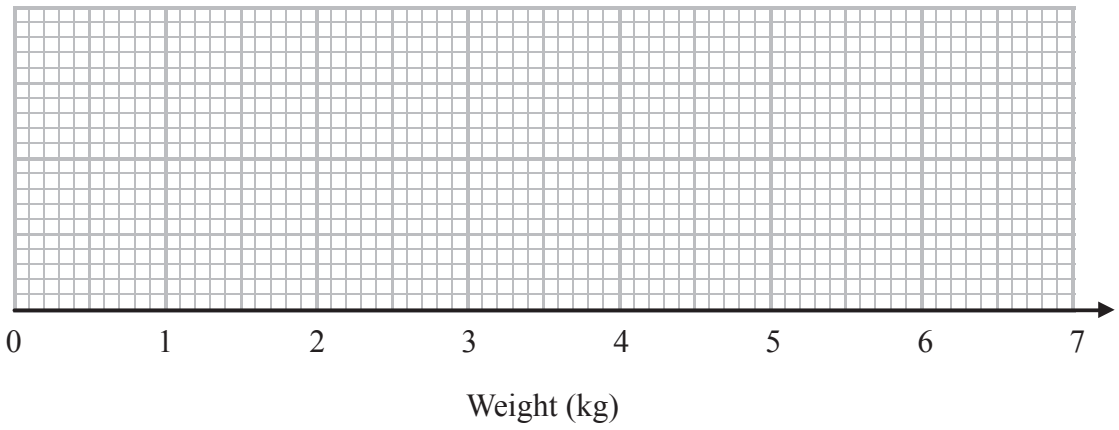
(4)

(Total for Question 8 is 6 marks)

9 The table gives information about the weights of 60 parcels.

Lowest	1.5 kg
Highest	6.3 kg
Lower quartile	2.7 kg
Interquartile range	1.7 kg
Median	3.2 kg

Draw a box plot for this information.



(Total for Question 9 is 3 marks)

10 The table shows information about the heights of 40 plants.

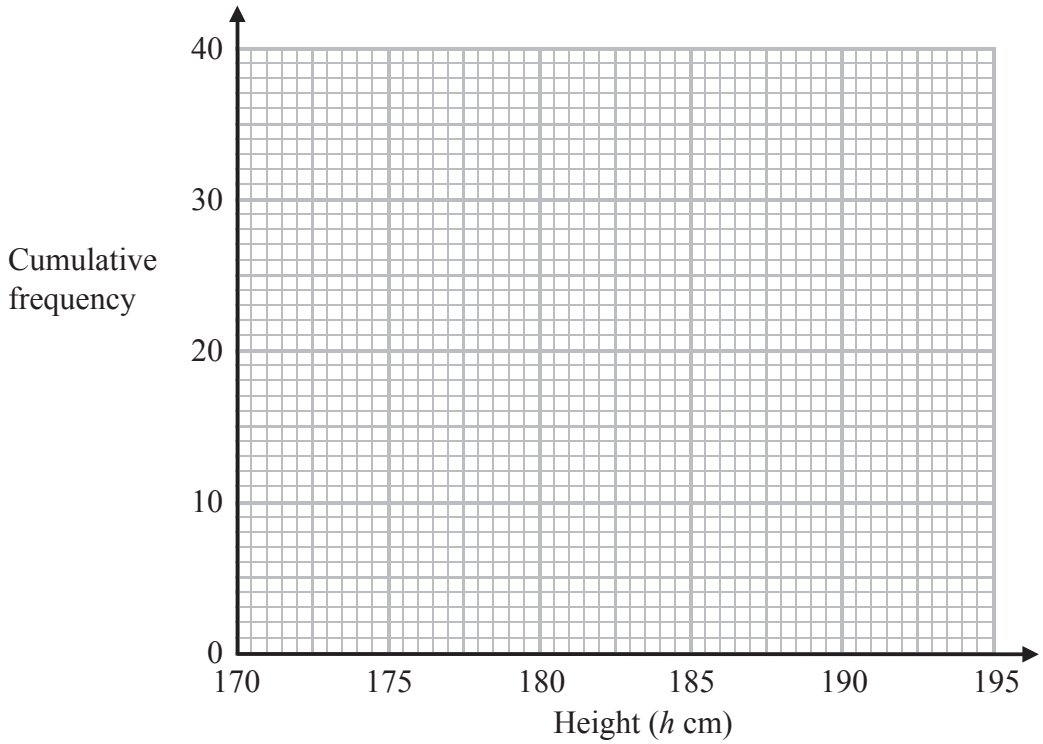
Height (h cm)	**Frequency**
$170 < h \leqslant 175$	5
$175 < h \leqslant 180$	18
$180 < h \leqslant 185$	12
$185 < h \leqslant 190$	4
$190 < h \leqslant 195$	1

(a) Complete the cumulative frequency table.

Height (h cm)	Cumulative frequency
$170 < h \leqslant 175$	
$170 < h \leqslant 180$	
$170 < h \leqslant 185$	
$170 < h \leqslant 190$	
$170 < h \leqslant 195$	

(1)

(b) On the grid, draw a cumulative frequency graph for your table.



(2)

(c) Find an estimate for the number of plants with a height greater than 187 cm.

.....

(2)

(Total for Question 10 is 5 marks)

***11** Laura is raising money for charity.

She has a game with two sets of cards.

Set A	1	3	5	6	7
Set B	2	4	8	9	

80 students are each going to play Laura's game once.

Each student takes at random one card from each set of cards.
They add the two numbers to get a total score.

Each student pays 70p to play the game.
Laura pays £3 to any student getting a total score of 9

Show that Laura can expect to make a profit of £20
You must show all your working.

(Total for Question 11 is 5 marks)

12 The table below shows some information about 600 students at a school.

Year	Boys	Girls
7	40	60
8	50	30
9	60	40
10	76	54
11		

A teacher is carrying out a survey.
She takes a sample, stratified both by Year group and by gender, of 40 of the 600 students.

(a) Calculate the number of Year 8 boys in the sample.

.....

(2)

There are 5 Year 11 girls in the sample.

(b) Find an estimate for the number of Year 11 girls at the school.
You must show all your working.

.....

(2)

(Total for Question 12 is 4 marks)

***13** Toga wants to estimate the number of termites in a nest.

On Monday Toga catches 80 termites.
He puts a mark on each termite.
He then puts all 80 termites back in the nest.

On Tuesday Toga catches 60 termites.
12 of these termites have a mark on them.

Work out an estimate for the total number of termites in the nest.
You must write down any assumptions you have made.

.....

(Total for Question 13 is 4 marks)

14 There are 11 counters in a bag.

4 of the counters are blue.
7 of the counters are green.

Maria takes at random a counter from the bag.
She keeps the counter.
She then takes at random another counter from the bag.

Work out the probability that Maria takes one counter of each colour.
You must show your working.

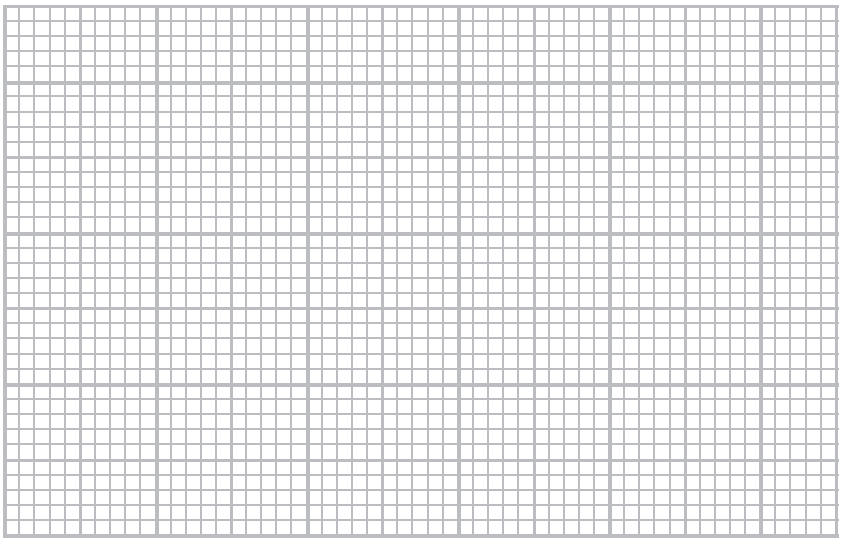
.....

(Total for Question 14 is 4 marks)

15 The table shows some information about the length of time some birds were on a bird table.

Time (t seconds)	Frequency
$0 < t \leqslant 10$	8
$10 < t \leqslant 20$	16
$20 < t \leqslant 25$	15
$25 < t \leqslant 30$	12
$30 < t \leqslant 50$	6

Draw a histogram for the information in the table.



(Total for Question 15 is 3 marks)

TOTAL FOR PAPER IS 60 MARKS