

Write your name here

Surname					Other names				
Centre Number					Candidate Number				
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Edexcel GCSE

Mathematics B

Unit 1: Statistics and Probability (Calculator)

Higher Tier

Mock Paper	Paper Reference
Time: 1 hour 15 minutes	5MB1H/01

You must have:
Ruler graduated in centimetres and millimetres, protractor, 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 – *you should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression.*

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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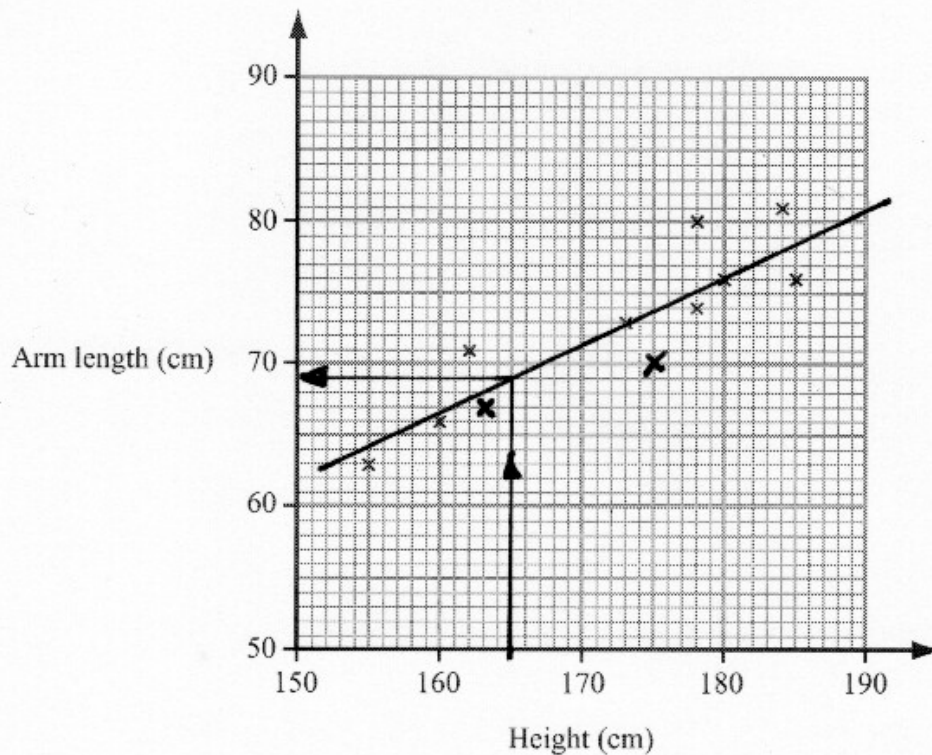
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Answer ALL questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1 The scatter diagram shows the height, in cm, and arm length, in cm, of some adults.



The table shows the height and the arm length of two more adults.

Height (cm)	175	163
Arm length (cm)	70	67

(a) On the scatter graph, plot the information from the table.

(1)

(b) What type of correlation does this scatter graph show?

Positive correlation

(1)

(c) Estimate the arm length of a 165 cm tall adult.

69

.....cm

(2)

(Total for Question 1 is 4 marks)



2 Kalipha wants to find out how much time students spend using their computers. He will use a questionnaire.

(a) Design a suitable question he could use on his questionnaire.

How much time do you spend on your computer each week, to the nearest hour?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0 hours	1-2 hours	3-5 hours	6-10 hours	11-20 hours	>20 hours

(2)

Kalipha stands outside a local supermarket at 9am on Friday. He gives his questionnaire to the first 10 people going into the supermarket.

This may **not** produce a good sample for Kalipha's survey.

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

Reason 1

Survey is biased towards people who are not at work on a Friday morning.

Reason 2

Sample is too small

(2)

(Total for Question 2 is 4 marks)



- 3 The table shows the probability that a biased dice will land on 1 or on 3 or on 4 or on 6

Number	1	2	3	4	5	6
Probability	0.1	x	0.2	0.1	x	0.3

- (a) Work out the value of x .

$$0.1 + 0.2 + 0.1 + 0.3 = 0.7$$

$$2x + 0.7 = 1, \quad 2x = 0.3,$$

$$x = 0.15$$

0.15

(3)

Paul is going to roll the dice 200 times.

- (b) Work out an estimate for the number of times that the dice will land on a 3

$$200 \times 0.2 = 40$$

40

(2)

(Total for Question 3 is 5 marks)

- 4 Sarah went on holiday to Antigua.

In the shops, prices are given in either US dollars (\$) or in East Caribbean dollars (EC\$).
The exchange rate was \$1 = EC\$2.70

The price of a hat was EC\$65

Sarah knew that £1 = \$1.45

Work out the price of the hat in pounds.

$$\text{EC}\$65 \times \left(\frac{\$1}{\text{EC}\$2.7} \right) \times \left(\frac{\pounds 1}{\$1.45} \right) = \pounds 16.60$$

The units you don't want
cancel out, top & bottom.

£ 16.60

(Total for Question 4 is 3 marks)



5 Here are the lengths, in mm, of some caterpillars.

15	14	10	9	21
23	24	30	32	8
17	14	15	18	22
16	20	31	8	9

In the space below, draw an ordered stem and leaf diagram for these lengths.

Unordered

0		9	8	8	9			
1		5	4	0	7	4	3	8
2		1	3	4	2	0		
3		0	2	1				

Ordered :

0		8	8	9	9			
1		0	3	4	4	5	6	7
2		0	1	2	3	4		
3		0	1	2				

Key:
1|3 means 13mm

(Total for Question 5 is 3 marks)



*6 Lesley is going to go on holiday.
 She will travel by plane.
 Lesley finds some information about three airlines.

Easyair	Cheapfly	Britair
Flight £225	Flight £74.98	Flight £104.88
Price includes 20 kg of luggage and all taxes	Plus Taxes £29.97 Check-in £20 Each 20 kg of luggage £36	Plus Each 15 kg of luggage £25
Special Offer $\frac{1}{5}$ off the price of all flights in October	Plus 3% extra charge for credit card payment	Plus 4.5% extra charge for credit card payment

Lesley will go on holiday in October.
 She will have 20 kg of luggage.

She will pay for her flight by credit card.

She will choose the airline with the cheapest total cost.

Which airline?

You must show your working.

Easyair $\frac{1}{5}$ off, pays 80% A nominal cost.
 $0.8 \times \pounds 225 = \pounds 180$

cheapfly

$$(74.98 + 29.97 + 20 + 36) \times 1.03 = \pounds 165.78$$

Britair

20kg luggage will cost $2 \times \pounds 25 = \pounds 50$

$$(104.88 + 50) \times 1.045 = \pounds 161.85$$

\therefore Britair is the cheapest

(Total for Question 6 is 6 marks)



- 7 The table gives information about the times, in minutes, that 50 people waited to pay at a supermarket check-out.

Time (t minutes)	Frequency	$2c$	fx
$0 < t \leq 2$	23	1	23
$2 < t \leq 4$	9	3	27
$4 < t \leq 6$	8	5	40
$6 < t \leq 8$	6	7	42
$8 < t \leq 10$	4	9	36

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

$$\frac{n+1}{2} = \frac{51}{2} = 25.5$$

$$\underline{2 < t \leq 4}$$

(1)

- (b) Work out an estimate for the mean time.

$$\Sigma fx = 168$$

$$\text{mean} = \frac{\Sigma fx}{\Sigma f} = \frac{168}{50} = 3.36$$

$$\underline{3.36} \text{ minutes}$$

(4)

(Total for Question 7 is 5 marks)



8 Karen measured the heights of some students.

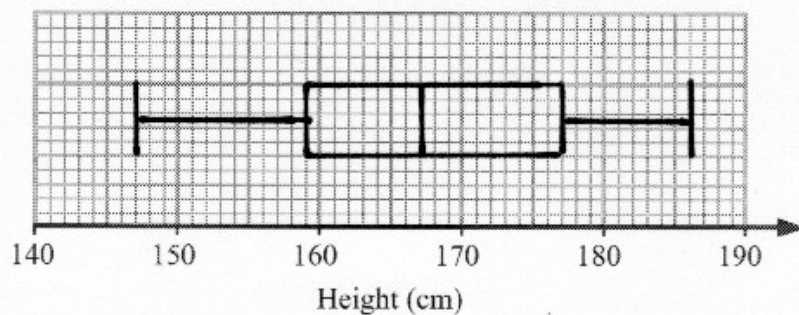
The table gives some information about her results.

Range of heights	39 cm
Height of tallest person	186 cm
Median height	167 cm
Lower quartile	159 cm
Interquartile range	18 cm

$$\text{Lowest} = 186 - 39 \\ = 147$$

$$\text{Upper quartile} = 159 + 18 \\ = 177$$

Use this information to draw a box plot for Karen's results.



(Total for Question 8 is 3 marks)

9 Jenny invested £6500 for 3 years in a savings account.
She was paid 4% compound interest per year.

How much did Jenny have in her savings account after 3 years.

$$£6500 \times 1.04^3 = 7311.62$$

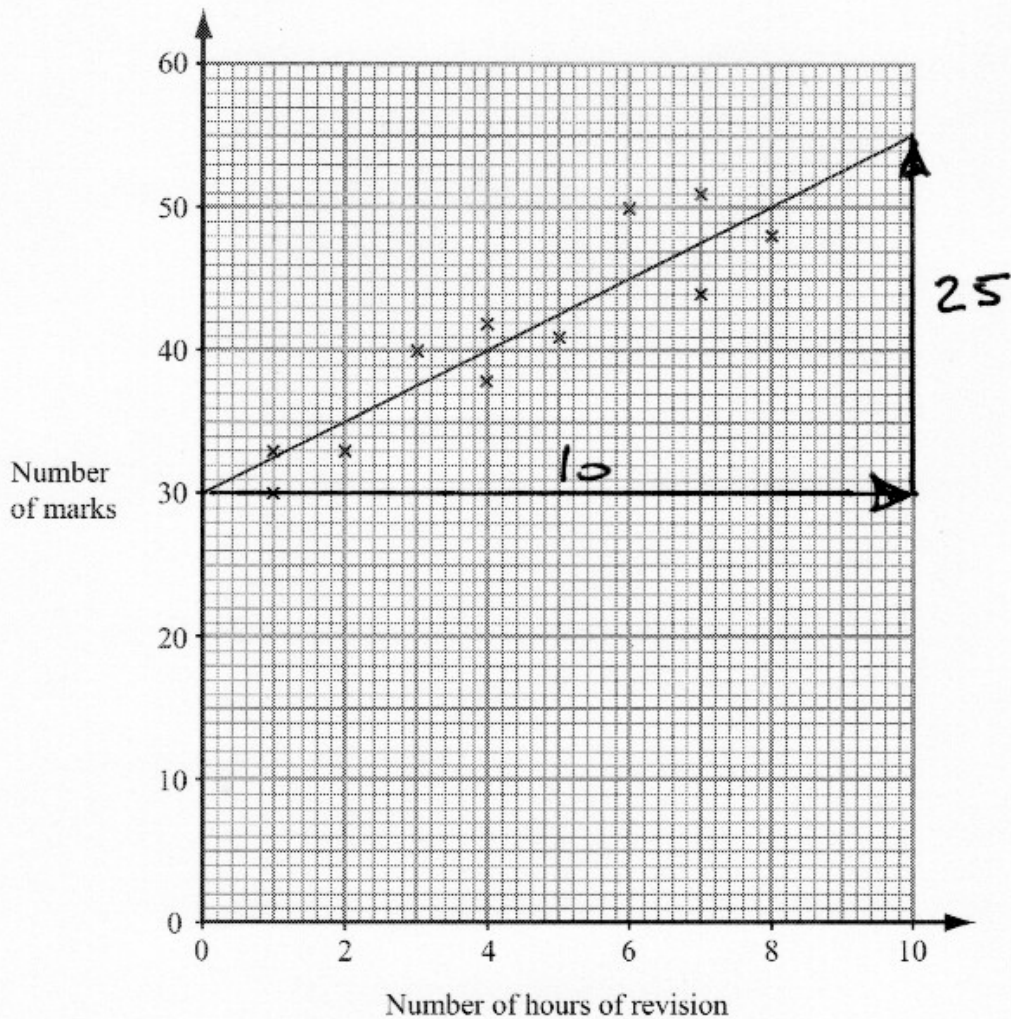
£ 7311.62

(Total for Question 9 is 3 marks)



- 10 A scatter diagram was drawn to show the relationship between the number of hours of revision (x) and the number of marks (y) scored in an exam by some students.

The line of best fit has been drawn on the scatter graph.



Work out the gradient of the line of best fit.

$$\text{gradient} = \frac{\text{up}}{\text{across}} = \frac{25}{10} = 2.5$$

2.5

(Total for Question 10 is 2 marks)



11 60 people each did a crossword puzzle.

The table shows some information about the times, in minutes, that they took.

Time (t minutes)	Frequency
$0 < t \leq 5$	3
$5 < t \leq 10$	6
$10 < t \leq 15$	17
$15 < t \leq 20$	21
$20 < t \leq 25$	8
$25 < t \leq 30$	5

(a) Complete the cumulative frequency table.

Time (t minutes)	Cumulative frequency
$0 < t \leq 5$	3
$0 < t \leq 10$	9
$0 < t \leq 15$	26
$0 < t \leq 20$	47
$0 < t \leq 25$	55
$0 < t \leq 30$	60

(1)

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

(2)

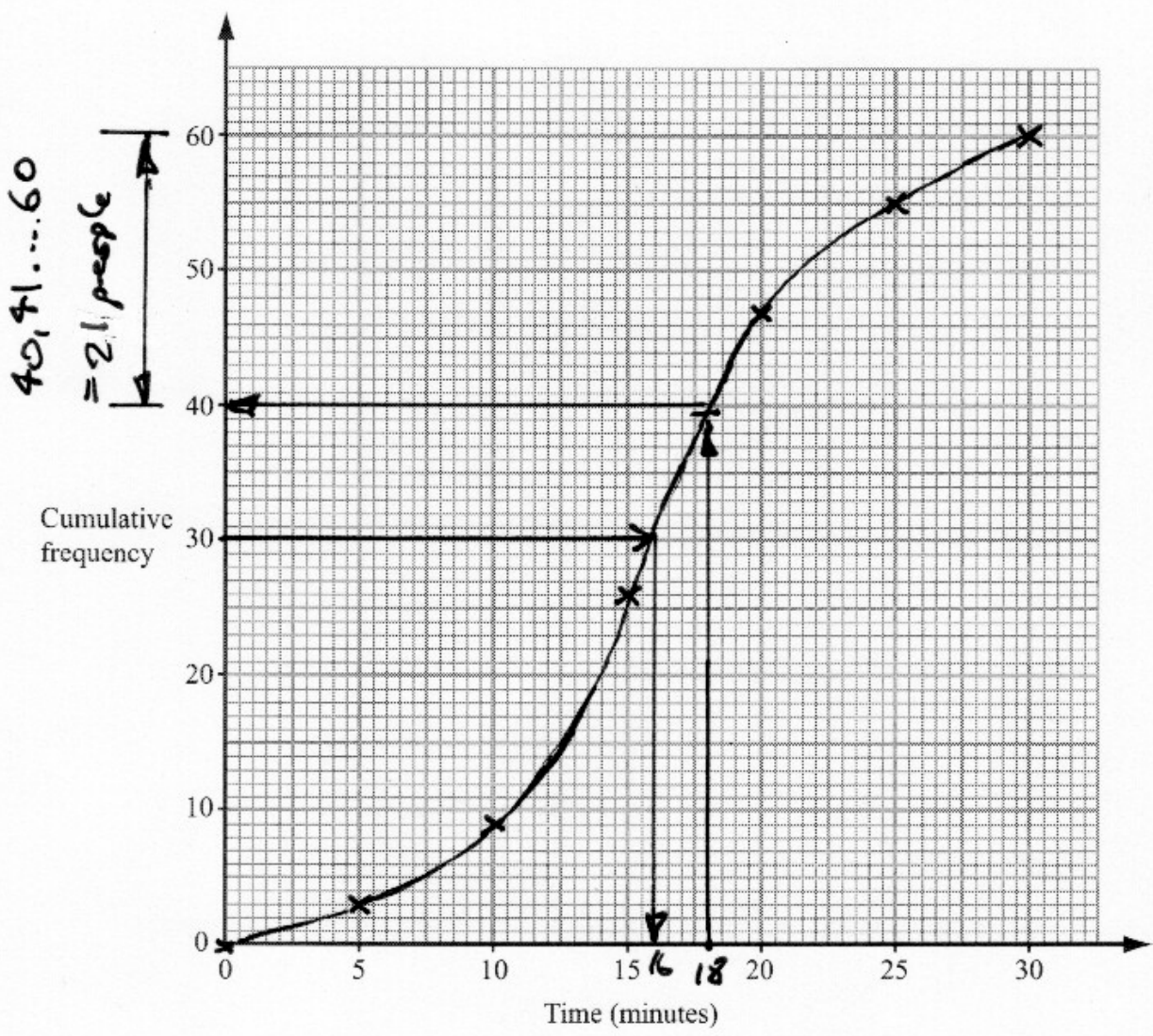
(c) Use your graph to find an estimate for the median time.

..... 16 minutes
(1)

(d) Use your graph to find an estimate for the number of people taking **more** than 18 minutes.

..... 21
(2)



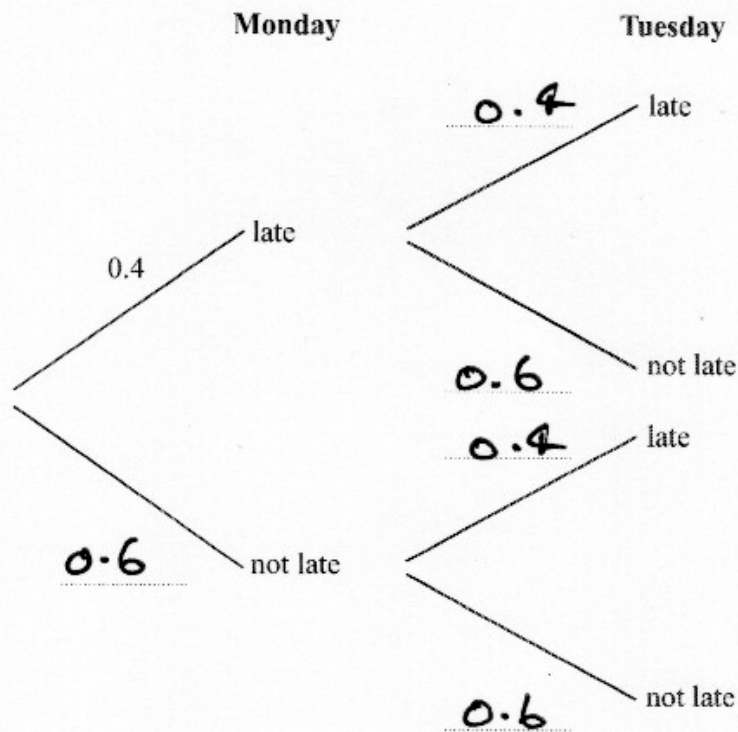


(Total for Question 11 is 6 marks)



12 The probability that John will be late for school on any day is 0.4

(a) Complete the probability tree diagram for both Monday and Tuesday.



(2)

(b) Work out the probability that John will be late for school on both days.

$$0.4 \times 0.4 = 0.16$$

0.16

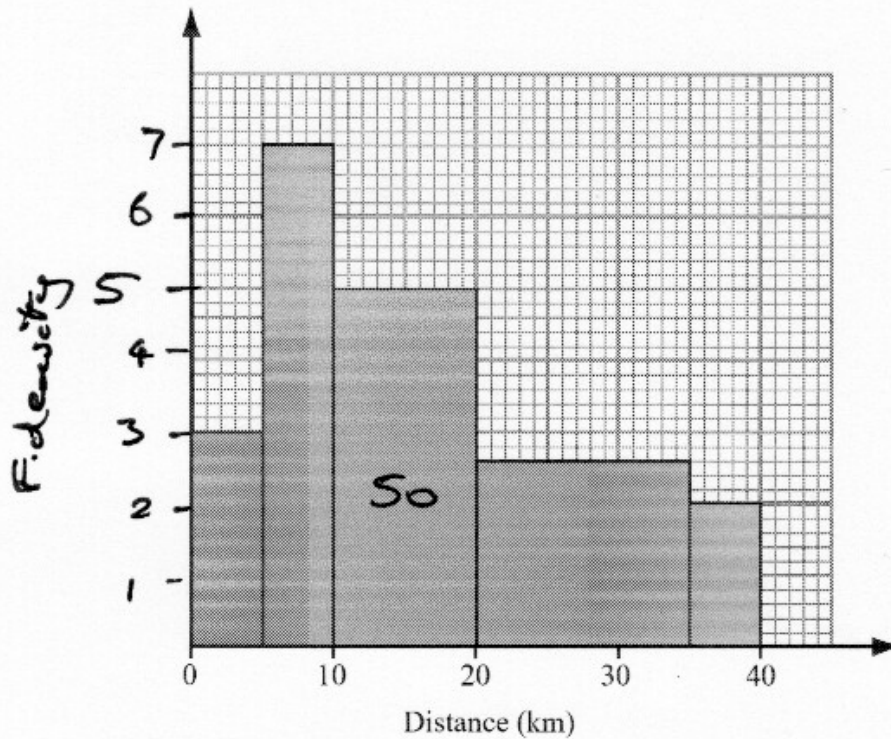
(2)

(Total for Question 12 is 4 marks)



13 Sam carried out a survey to find out how far people travel to work.

The histogram gives some information about the results of her survey.



Nobody in Sam's survey travelled more than 40 km to work.

Fifty people travelled 10 to 20 km to work.

How many people were in Sam's survey?

$$\text{For the } 10-20 \text{ class, f. density} = 50/10 = 5$$

$$\begin{aligned} \text{Total area} &= 3 \times 5 + 7 \times 5 + 50 + 2.6 \times 15 + 2 \times 5 \\ &= 149 \end{aligned}$$

149

(Total for Question 13 is 3 marks)



14 (a) Explain what is meant by a random sample.

A random sample is a selection of items from the population, chosen such that each item in the population, had an equal chance of being picked. (1)

A headteacher wants to take a random sample of the pupils in her school.

(b) Describe a method she could use.

Number the pupils 0, 1, 2, 3 ... and use a random number generator to select them, until she has as many as she needs. (1)

The table gives information about the number of students at the school.

	Boys	Girls	Total
Year 9	67	72	139
Year 10	84	83	167
Year 11	79	83	162
Year 12	53	58	111
Year 13	62	55	117
Total	345	351	696

The headteacher decides to take a sample of 100 students stratified by both gender and Year.

(c) Work out how many Year 12 girls should be in her sample.

$$\frac{58}{696} \times 100 = 8\frac{1}{3}$$

round \rightarrow 8

8

(2)

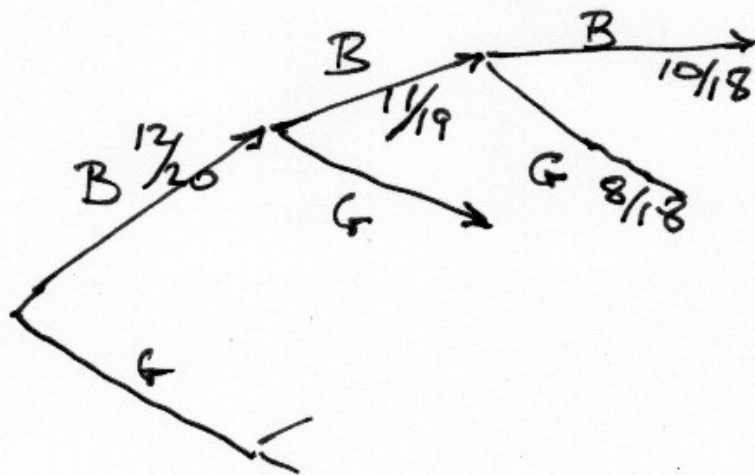
(Total for Question 14 is 4 marks)



- 15 There are 12 boys and 8 girls in a class.
A teacher chooses at random 3 students from the class.

Work out the probability that the teacher chooses at least 2 boys.

$$P(\text{at least 2 boys}) = P(\text{BBB}) + P(\text{BBG, any order}).$$



We can get BBG in 3 ways:

BBG, BGB, GBB, all equally likely.

$$\therefore P(\text{at least 2 boys}) = \frac{12}{20} \times \frac{11}{19} \times \frac{10}{18}$$

$$+ 3 \times \frac{12}{20} \times \frac{11}{19} \times \frac{8}{18}$$

$$= \frac{187}{285} \quad (\text{or } \frac{4488}{6840})$$

$$\frac{187}{285}$$

(Total for Question 15 is 5 marks)

TOTAL FOR PAPER IS 60 MARKS