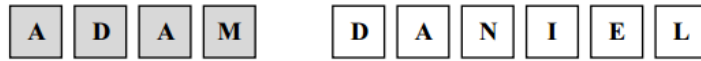


Question 1



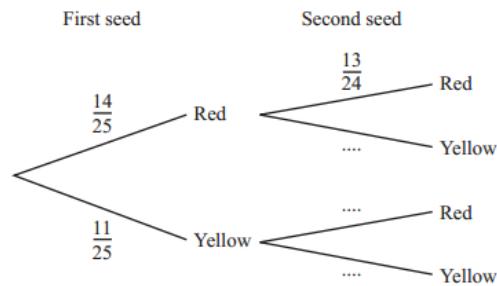
Adam writes his name on four red cards and Daniel writes his name on six white cards.

- (a) One of the ten cards is chosen at random. Find the probability that
- (i) the letter on the card is **D**, [1]
  - (ii) the card is red, [1]
  - (iii) the card is red **or** the letter on the card is **D**, [1]
  - (iv) the card is red **and** the letter on the card is **D**, [1]
  - (v) the card is red **and** the letter on the card is **N**. [1]
- (b) Adam chooses a card at random and then Daniel chooses one of the remaining 9 cards at random.  
Giving your answers as fractions, find the probability that the letters on the two cards are
- (i) both **D**, [2]
  - (ii) both **A**, [2]
  - (iii) the same, [2]
  - (iv) different. [2]

Question 2

A gardener plants seeds from a packet of 25 seeds.  
14 of the seeds will give red flowers and 11 will give yellow flowers.  
The gardener chooses two seeds at random.

- (a) Write the missing probabilities on the tree diagram below.



[2]

- (b) What is the probability that the gardener chooses two seeds which will give
- (i) two red flowers,

Answer(b)(i) ..... [2]

- (ii) two flowers of a different colour?

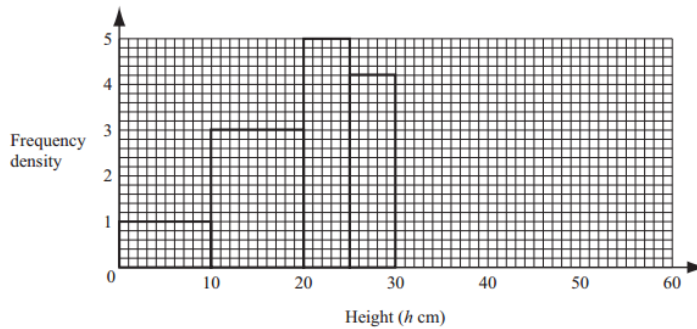
Answer(b)(ii) ..... [2]

### Question 3

- (a) Students are given marks 0, 1, 2, 3 or 4 for a piece of work.  
The table shows the number of students getting each mark.

Mark	0	1	2	3	4
Frequency	3	10	12	9	$x$

- (i) The mean mark is 2.125.  
Find the value of  $x$ . [4]
- (ii) Write down the lower quartile mark. [1]
- (b) The heights ( $h$  centimetres) of flowers in a shop are shown in the histogram below.  
All the flowers are less than 60 cm high.  
One bar has not been drawn on the histogram.



- (i) There are 25 flowers in the interval  $20 < h \leq 25$ .  
How many flowers are there in the intervals
- (a)  $25 < h \leq 30$ , [1]
- (b)  $10 < h \leq 20$ ? [1]
- (ii) There are 42 flowers in the interval  $30 < h \leq 60$ .  
This can be shown by a single bar on the histogram.  
Calculate the height of this bar. [2]
- (iii) Calculate an estimate of the mean height of the flowers. [3]

### Question 4

Answer the whole of this question on one sheet of graph paper.

The heights ( $h$  cm) of 270 students in a school are measured and the results are shown in the table.

$h$	Frequency
$120 < h \leq 130$	15
$130 < h \leq 140$	24
$140 < h \leq 150$	36
$150 < h \leq 160$	45
$160 < h \leq 170$	50
$170 < h \leq 180$	43
$180 < h \leq 190$	37
$190 < h \leq 200$	20

- (a) Write down the modal group. [1]
- (b) (i) Calculate an estimate of the mean height. [4]
- (ii) Explain why the answer to part (b)(i) is an estimate. [1]
- (c) The following table shows the cumulative frequencies for the heights of the students.

$h$	Cumulative frequency
$h \leq 120$	0
$h \leq 130$	$p$
$h \leq 140$	$q$
$h \leq 150$	$r$
$h \leq 160$	120
$h \leq 170$	170
$h \leq 180$	213
$h \leq 190$	250
$h \leq 200$	270

- Write down the values of  $p$ ,  $q$  and  $r$ . [2]
- (d) Using a scale of 1 cm to 5 units, draw a horizontal  $h$ -axis, starting at  $h = 120$ .  
Using a scale of 1 cm to 20 units on the vertical axis, draw a cumulative frequency diagram. [5]
- (e) Use your diagram to find
- (i) the median height, [1]
- (ii) the upper quartile, [1]
- (iii) the inter-quartile range, [1]
- (iv) the 60th percentile. [1]
- (f) All the players in the school's basketball team are chosen from the 30 tallest students.  
Use your diagram to find the least possible height of any player in the basketball team. [2]

Question 5

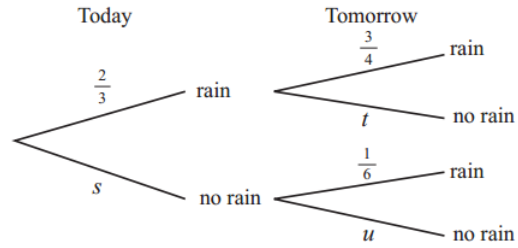
Give your answers to this question as fractions.

- (a) The probability that it rains today is  $\frac{2}{3}$ .

If it rains today, the probability that it will rain tomorrow is  $\frac{3}{4}$ .

If it does not rain today, the probability that it will rain tomorrow is  $\frac{1}{6}$ .

The tree diagram below shows this information.



- (i) Write down, as fractions, the values of  $s$ ,  $t$  and  $u$ . [3]  
 (ii) Calculate the probability that it rains on both days. [2]  
 (iii) Calculate the probability that it will not rain tomorrow. [2]
- (b) Each time Christina throws a ball at a target, the probability that she hits the target is  $\frac{1}{3}$ .  
 She throws the ball three times.  
 Find the probability that she hits the target
- (i) three times, [2]  
 (ii) at least once. [2]
- (c) Each time Eduardo throws a ball at the target, the probability that he hits the target is  $\frac{1}{4}$ .  
 He throws the ball until he hits the target.  
 Find the probability that he **first** hits the target with his
- (i) 4th throw, [2]  
 (ii)  $n$ th throw. [1]

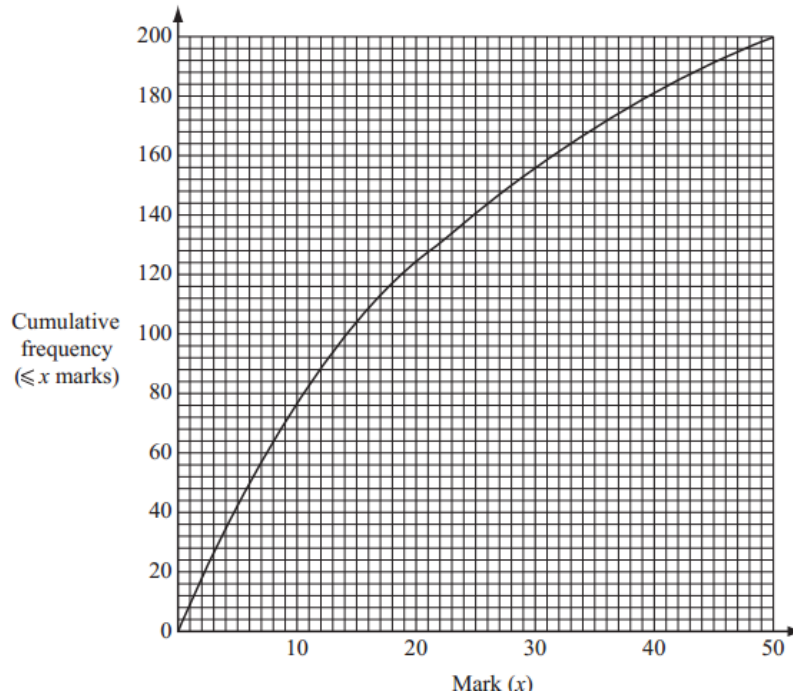
Question 6

- (a) The quiz scores of a class of  $n$  students are shown in the table.

Quiz score	6	7	8	9
Frequency (number of students)	9	3	$a$	5

The mean score is 7.2. Find

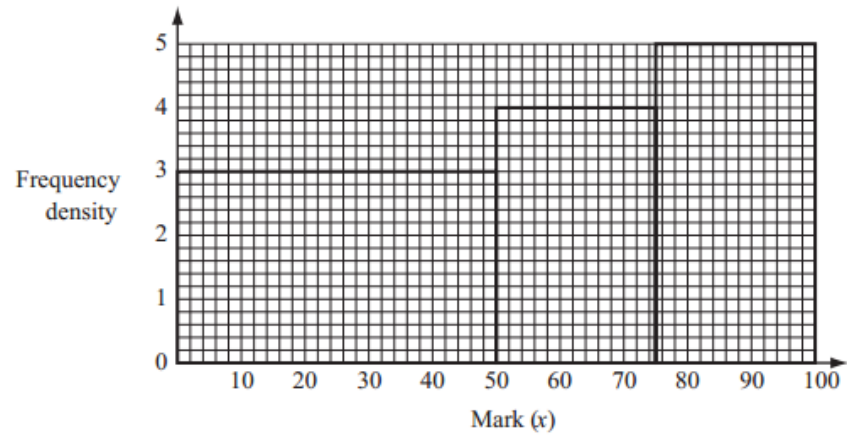
- (i)  $a$ ,  
 (ii)  $n$ ,  
 (iii) the median score.
- (b) 200 students take a mathematics test.  
 The cumulative frequency diagram shows the results.



Write down

- (i) the median mark, [1]  
 (ii) the lower quartile, [1]  
 (iii) the upper quartile, [1]  
 (iv) the inter-quartile range, [1]  
 (v) the lowest possible mark scored by the top 40 students, [1]  
 (vi) the number of students scoring more than 25 marks. [1]

- (c) Another group of students takes an English test.  
The results are shown in the histogram.



100 students score marks in the range  $50 < x \leq 75$ .

- (i) How many students score marks in the range  $0 < x \leq 50$ ? [1]
- (ii) How many students score marks in the range  $75 < x \leq 100$ ? [1]
- (iii) Calculate an estimate of the mean mark of this group of students. [4]