1. Nov/2020/Paper_12/No.4

   Fernando records the favourite sport of each of 20 people.

football	cricket	rugby	cricket	rugby	rugby	football	football	rugby	football
cricket	rugby	tennis	football	tennis	football	rugby	cricket	football	cricket

   (a) Complete the frequency table to show this information.
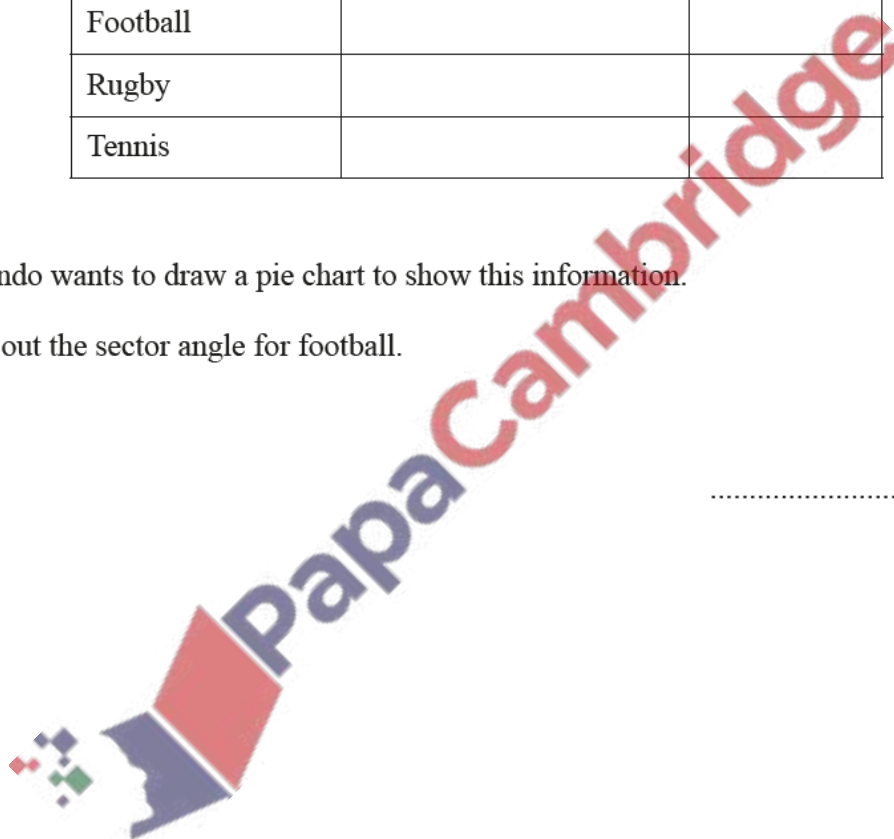   You may use the tally column to help you.

Favourite sport	Tally	Frequency
Cricket		
Football		
Rugby		
Tennis		

   [2]

   (b) Fernando wants to draw a pie chart to show this information.

   Work out the sector angle for football.

   .... [2]

A bag contains 7 red discs, 5 green discs and 2 pink discs.

(a) Helen takes one disc at random, records the colour and replaces it in the bag.
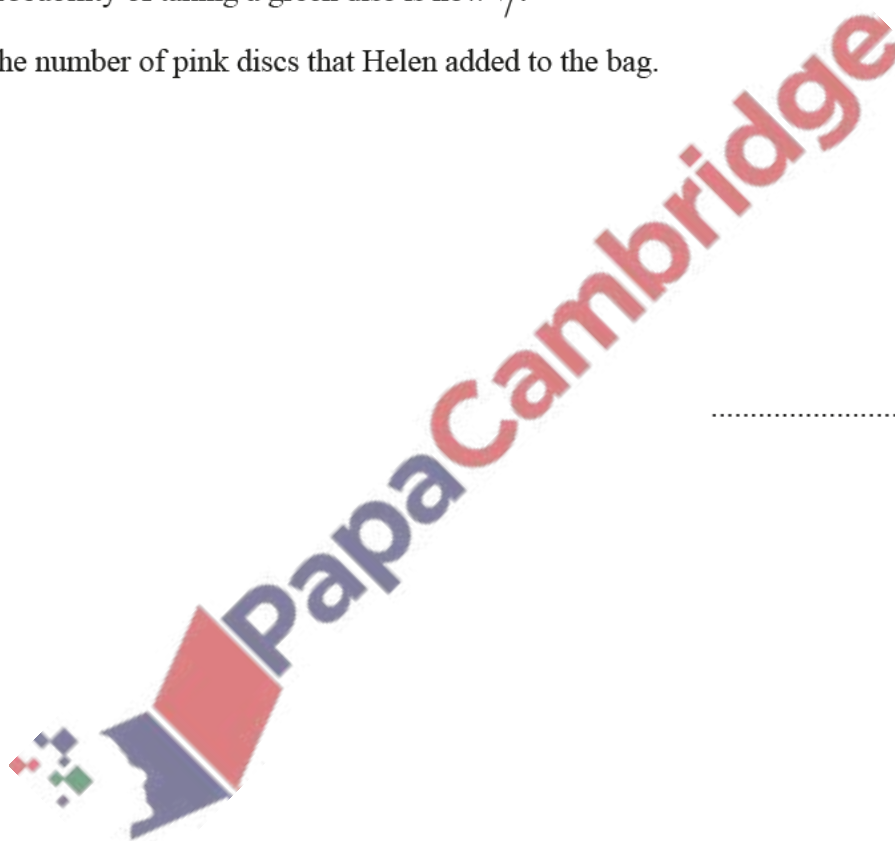She does this 140 times.

Find how many times she expects to take a green disc.
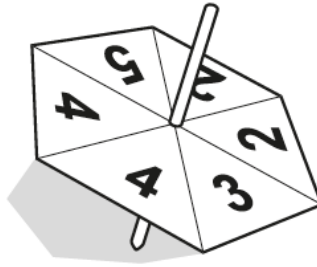
.... [2]

(b) Helen adds 9 green discs and some pink discs to the discs already in the bag.
The probability of taking a green disc is now $\frac{2}{7}$.

Find the number of pink discs that Helen added to the bag.

.... [2]

3.

(a) Jian has a fair spinner in the shape of a regular hexagon.
The spinner is numbered 2, 2, 3, 4, 4, 5.

Jian spins the spinner.

Find the probability that the spinner lands on
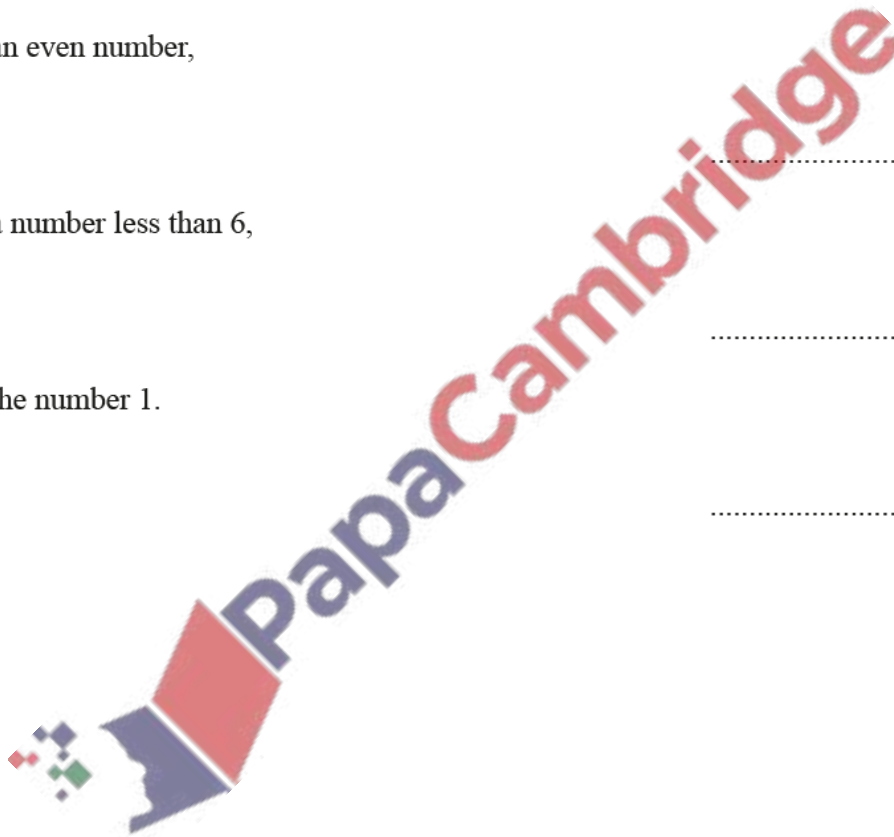
(i) an even number,

.... [1]

(ii) a number less than 6,

.... [1]
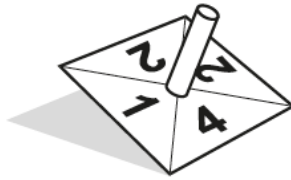
(iii) the number 1.

.... [1]

(b) Mei has two fair square spinners, A and B.
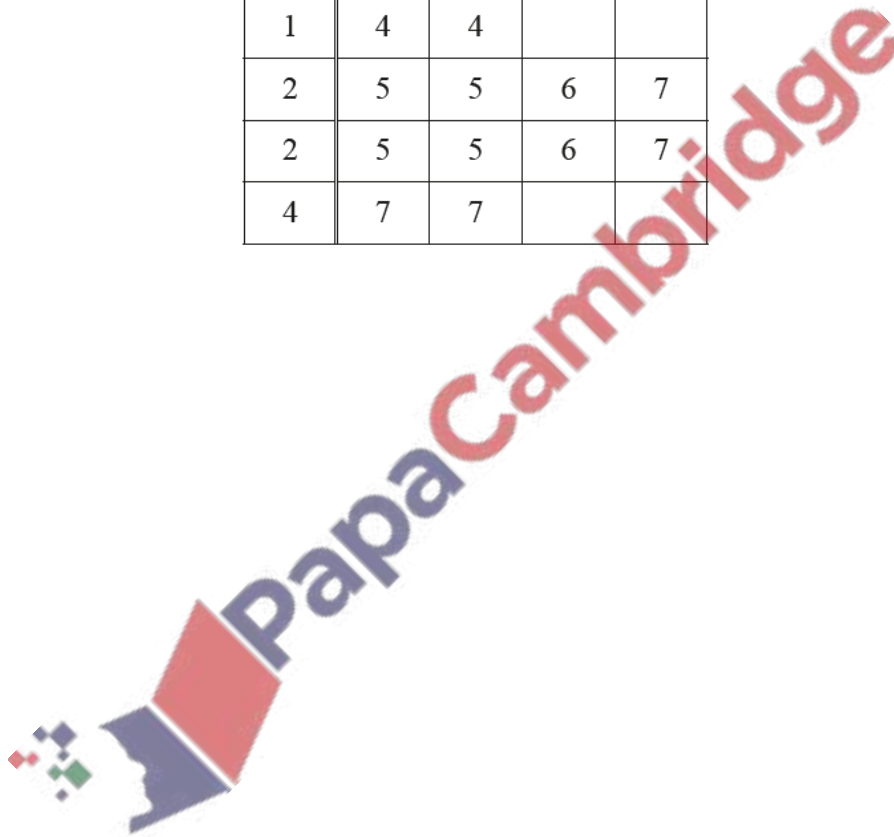Spinner A is numbered 1, 2, 2, 4 and spinner B is numbered 3, 3, 4, 5.

Spinner A   Spinner B

She spins both spinners and adds the two numbers.

(i) Complete the table to show all the possible outcomes.

A \ B	3	3	4	5
1	4	4		
2	5	5	6	7
2	5	5	6	7
4	7	7		

[2]

(ii) Use the table to write down the probability that the total is

(a) 5,

.... [1]

(b) more than 5.

.... [1]

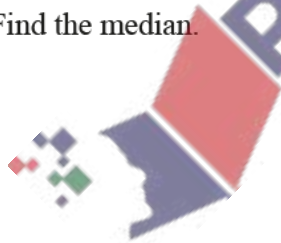**(c)** Ning has a spinner numbered 1 to 6.
She spins it 50 times and her results are shown in the table.

Number on spinner	Frequency
1	15
2	12
3	9
4	5
5	2
6	7

(i) Write down the mode.

.... [1]

(ii) Find the median.

.... [1]

(iii) Work out the mean.

.... [3]

4	6	3	4	2	3
Red	Yellow	Blue	Blue	Yellow	Blue
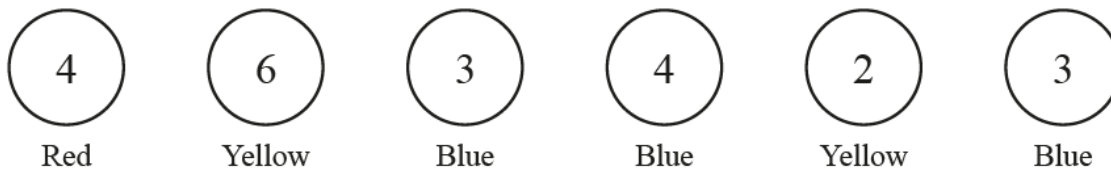
The diagram shows six discs.
Each disc has a colour and a number.

(a) One disc is picked at random.

Write down the probability that

    (i) the disc has the number 4,

.... [1]

    (ii) the disc is red and has the number 3,

.... [1]

    (iii) the disc is blue and has the number 4.

.... [1]

(b) Two of the six discs are picked at random **without** replacement.

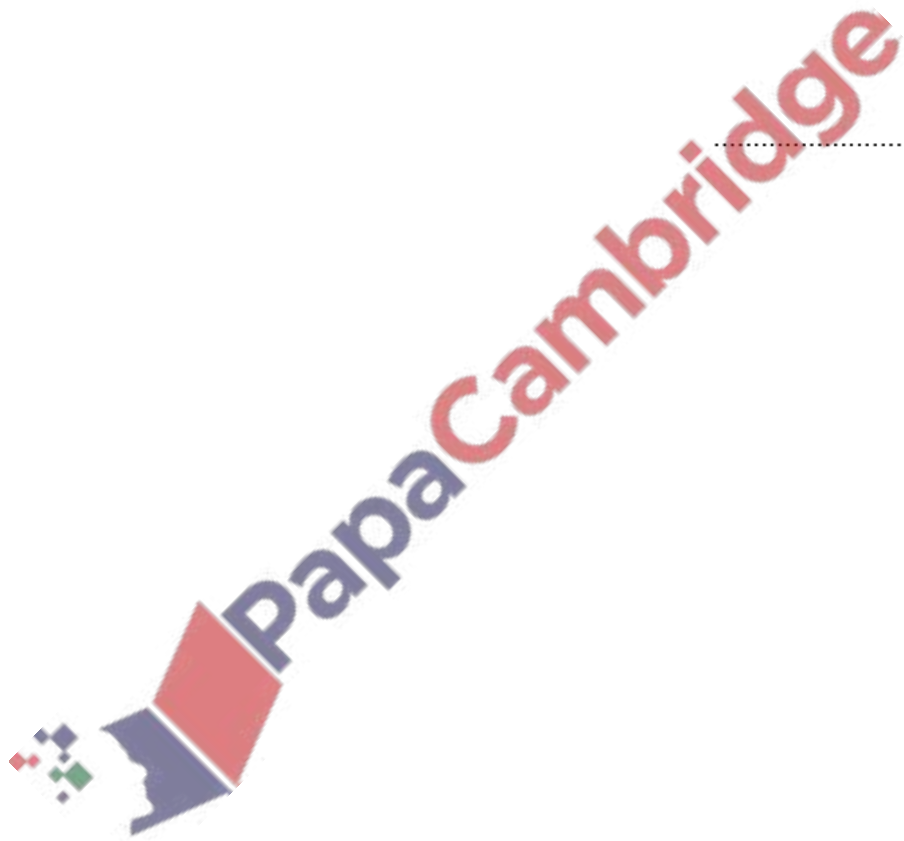Find the probability that

    (i) both discs have the number 3,

.... [2]

    (ii) both discs have the same colour.

.... [3]

(c) Two of the six discs are picked at random **with** replacement.

Find the probability that both discs have the same colour.

.... [3]

P	O	S	S	I	B	I	L	I	T	Y

Morgan picks two of these letters, at random, **without** replacement.

(a) Find the probability that he picks

(i) the letter Y first,

.... [1]

(ii) the letter B then the letter Y,

.... [2]

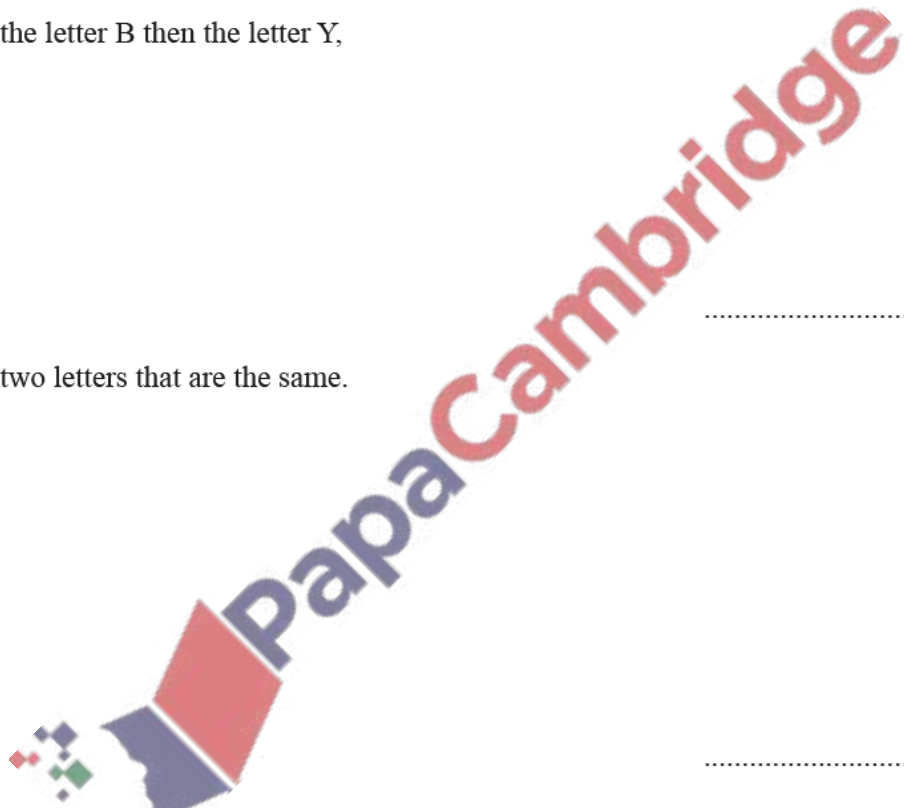**(iii)** two letters that are the same.

.... [3]

(b) Morgan now picks a third letter at random.

Find the probability that
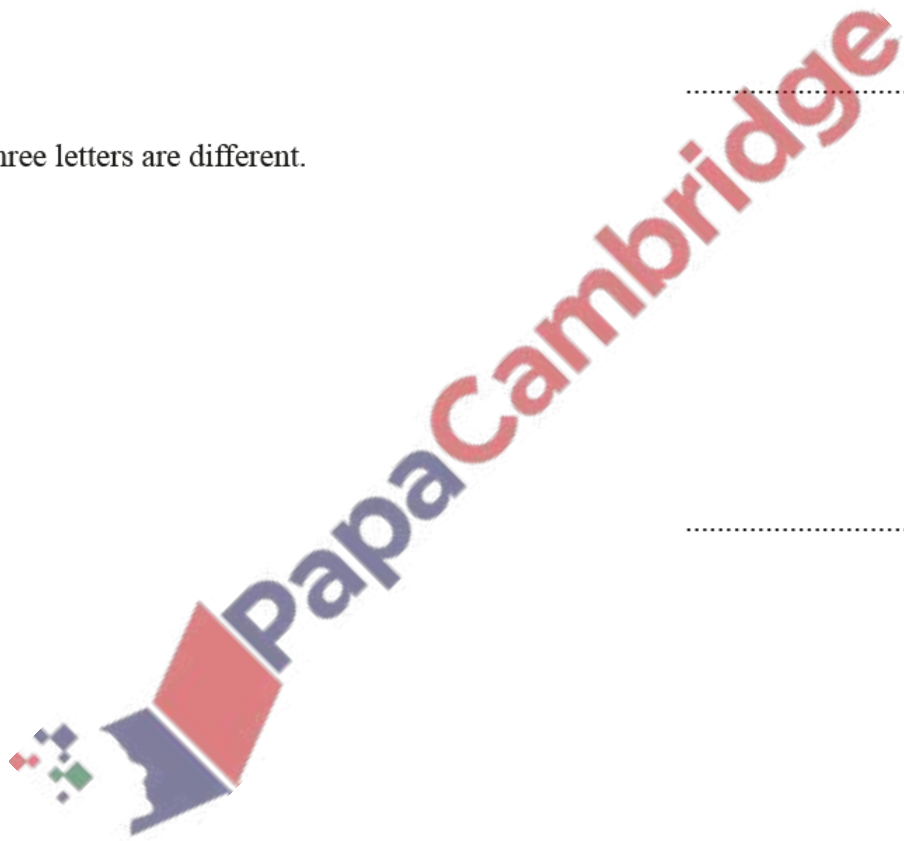
(i) all three letters are the same,

.... [2]

(ii) exactly two of the three letters are the same,

.... [5]

(iii) all three letters are different.

.... [2]

6.

The diagram shows a fair 8-sided spinner.
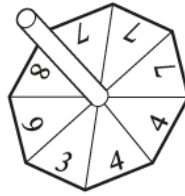
The numbers on the spinner are 3, 4, 4, 7, 7, 7, 8 and 9.

(a) The spinner is spun once.

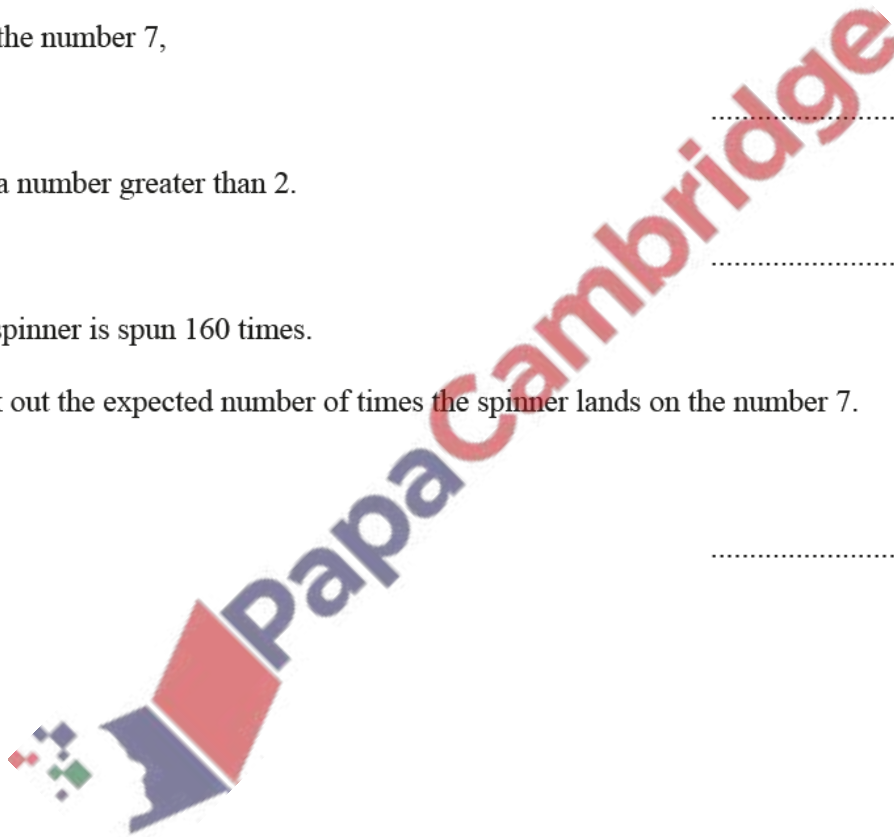Write down the probability that the spinner lands on

(i) the number 7,

.... [1]

(ii) a number greater than 2.

.... [1]

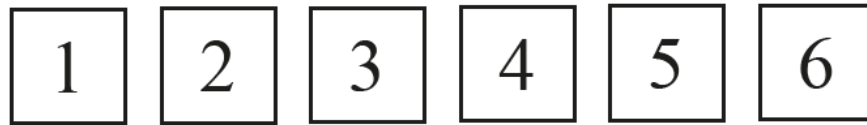**(b)** The spinner is spun 160 times.

Work out the expected number of times the spinner lands on the number 7.

.... [1]

Suleika has six cards numbered 1 to 6.

| 1 | 2 | 3 | 4 | 5 | 6 |

(a) She takes one card at random, records the number and replaces the card.

(i) Write down the probability that the number is 5 or 6.

.... [1]

(ii) Suleika does this 300 times.

Find how many times she expects the number 5 or 6.

.... [1]

(b) Suleika takes two cards at random, without replacement.

(i) Find the probability that the sum of the numbers on the two cards is 5.

.... [3]
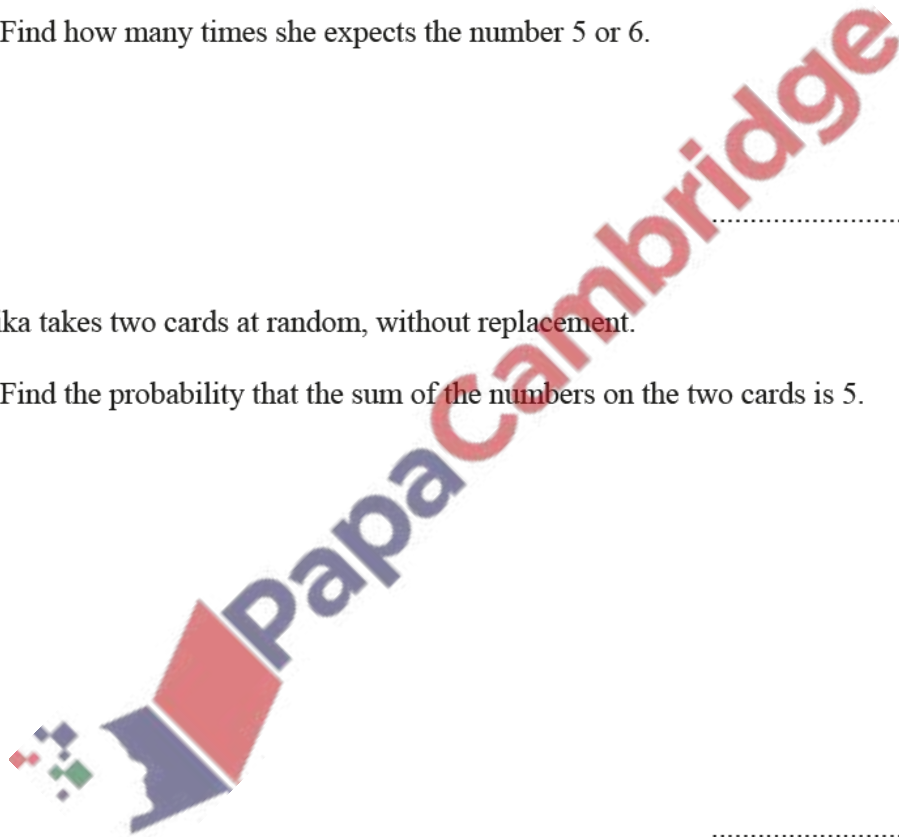
(ii) Find the probability that at least one of the numbers on the cards is a square number.

.... [3]

8.
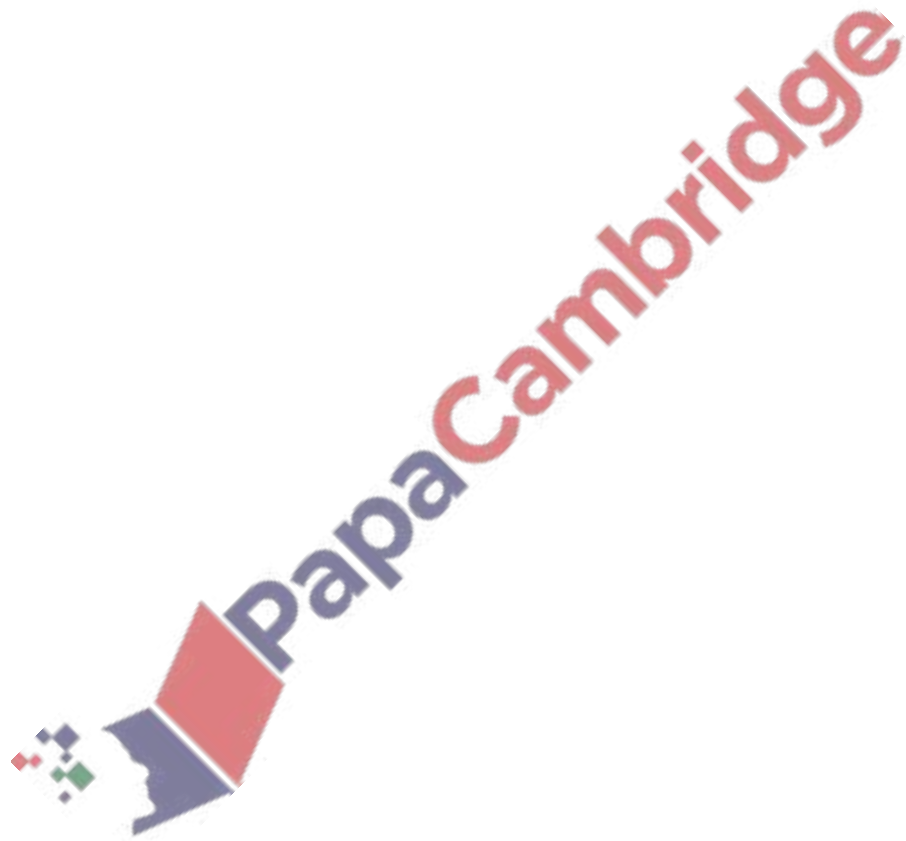
On any day, the probability that Marcus will get a seat on the school bus is 0.93 .

(a) Write down the probability that he will **not** get a seat on the school bus today.

.... [1]

(b) There are 200 school days in a year.

Work out the expected number of days in a year that Marcus will **not** get a seat.

.... [1]
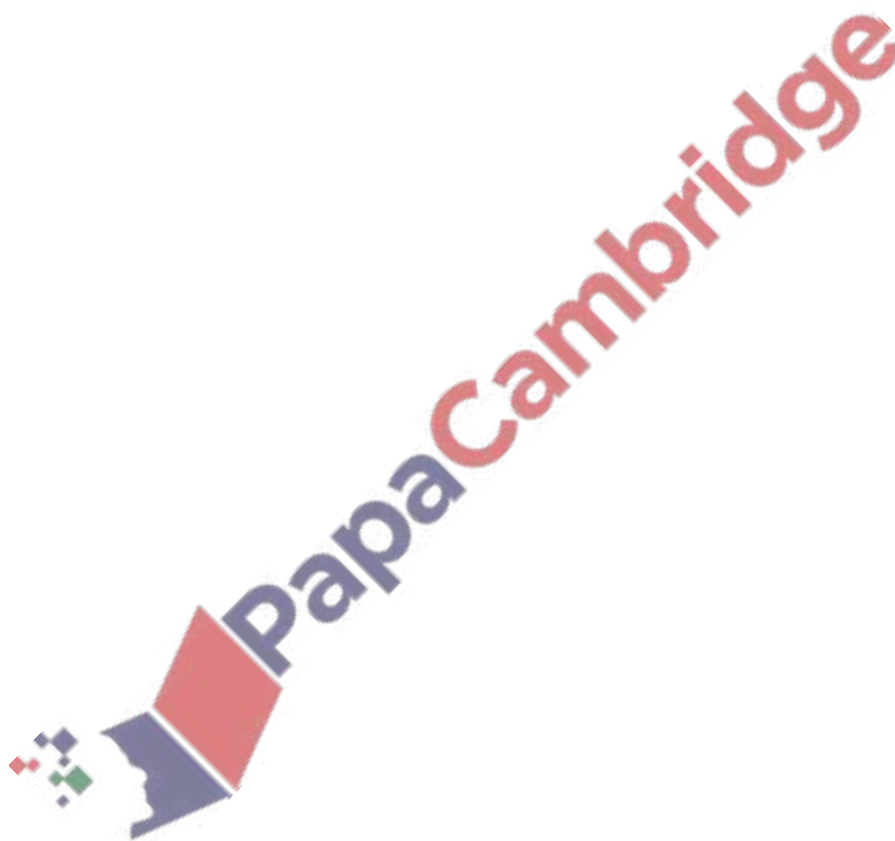
A bag contains blue, red, yellow and green balls only.
A ball is taken from the bag at random.
The table shows some information about the probabilities.

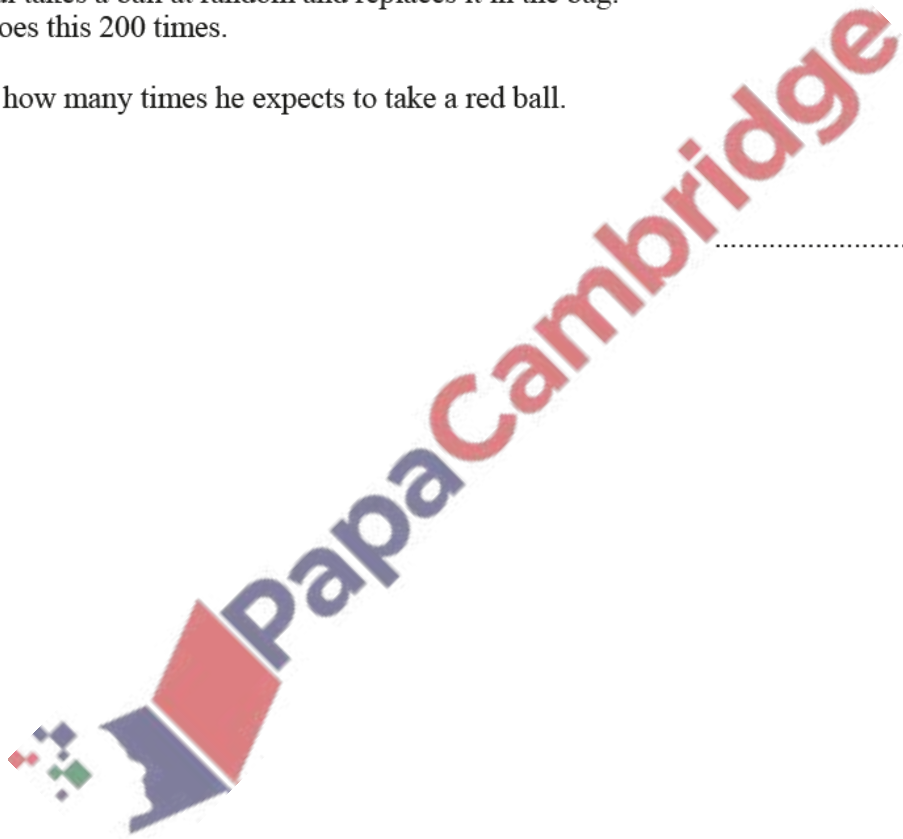| Colour	Blue	Red	Yellow	Green
Probability	0.15	0.2		0.43

(a) Complete the table.

[2]

(b) Abdul takes a ball at random and replaces it in the bag.
He does this 200 times.

Find how many times he expects to take a red ball.

.... [1]

(a) Paul has a set of 8 cards, each with a number written on it.
The numbers on the cards are 1, 1, 2, 3, 3, 3, 4, 5.
One card is taken at random.

Write down the probability that the number on the card is

(i) 1,

.... [1]

(ii) an odd number,

.... [1]

(iii) a prime number,

.... [1]

(iv) a number less than 6.

.... [1]

(b) Dina has a set of 12 cards.
These are the numbers on the cards.

3   4   1   3   2   1   3   4   2   2   1   3

Work out

(i) the median,

.... [2]

(ii) the mode,

.... [1]

(iii) the mean,

.... [2]
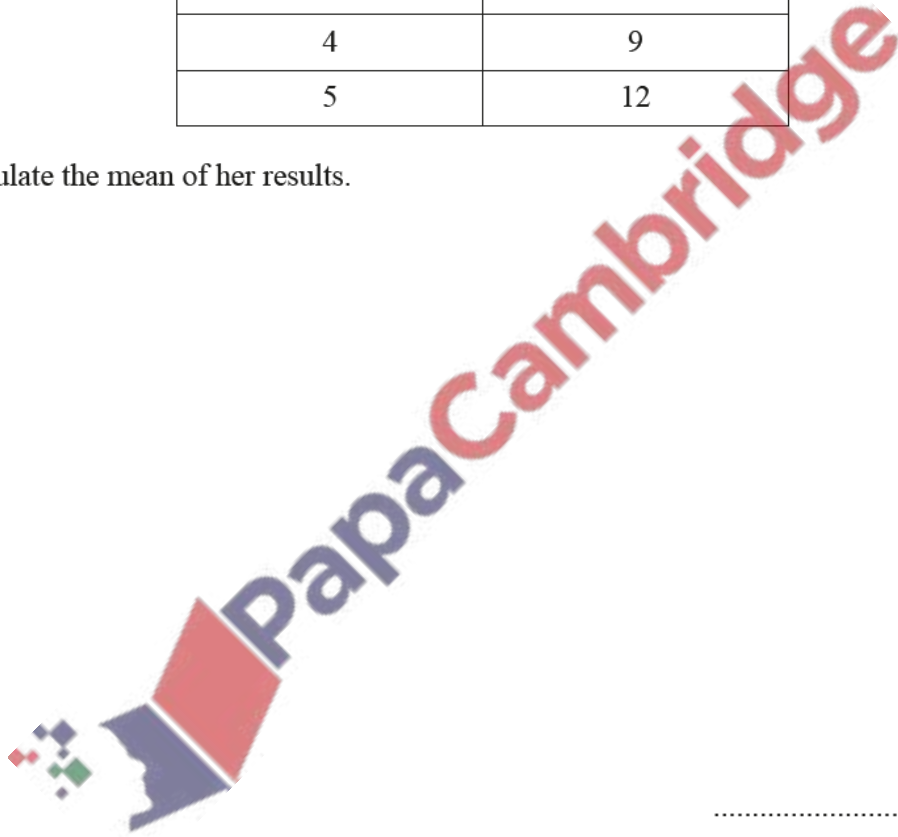
(iv) the range.

.... [1]

(c) Helena has a different set of cards.
She takes one card at random and records the number shown.
She does this 50 times.
The results are shown in the table.

Number on card	Frequency
1	8
2	11
3	10
4	9
5	12

Calculate the mean of her results.

.... [3]

Tanya plants some seeds.

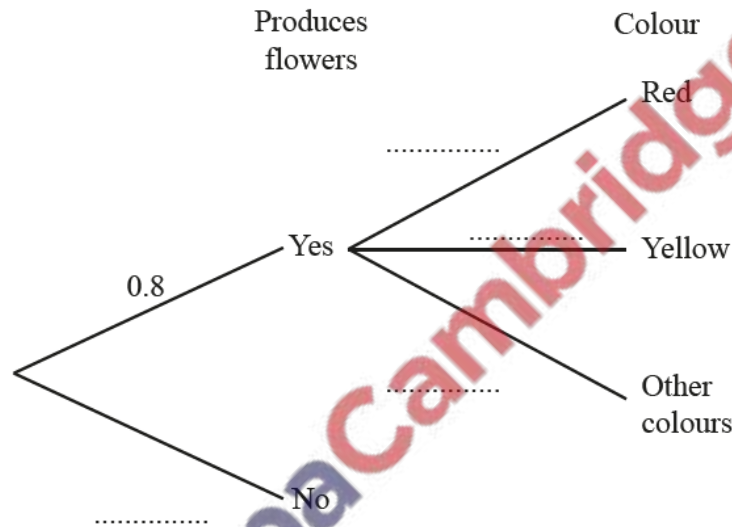The probability that a seed will produce flowers is 0.8 .

When a seed produces flowers, the probability that the flowers are red is 0.6 and the probability that the flowers are yellow is 0.3 .

(a) Tanya has a seed that produces flowers.

Find the probability that the flowers are not red and not yellow.

.... [1]

(b) **(i)** Complete the tree diagram.

[2]

(ii) Find the probability that a seed chosen at random produces red flowers.

.... [2]

(iii) Tanya chooses a seed at random.

Find the probability that this seed does not produce red flowers and does not produce yellow flowers.

.... [3]

(c) Two of the seeds are chosen at random.

Find the probability that one produces flowers and one does not produce flowers.

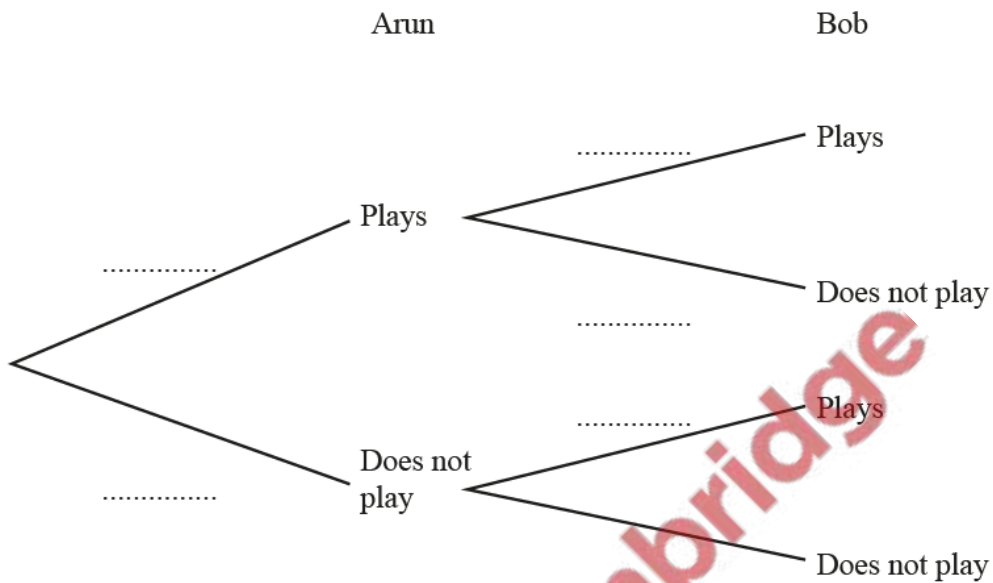.. [3]
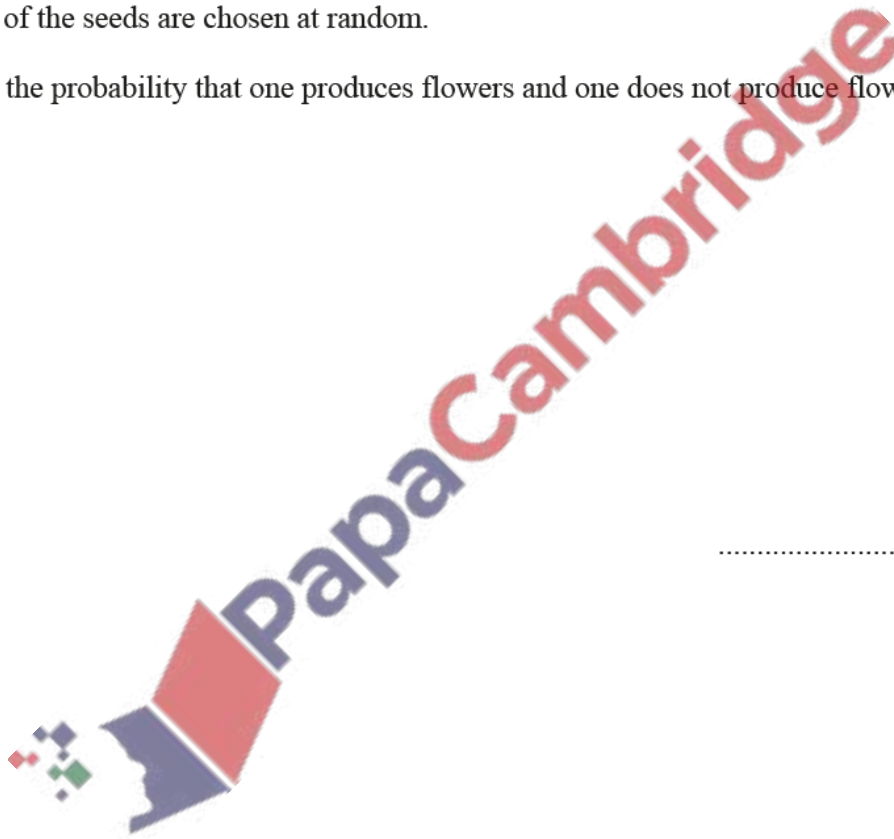
On any Saturday, the probability that Arun plays football is $\frac{3}{4}$.

On any Saturday, the probability that Bob plays football is $\frac{2}{5}$.

(a) (i) Complete the tree diagram.

Arun   Bob

Plays

.... — Plays

....

Plays

.... — Does not play

....

.... — Plays

Does not play

....

.... — Does not play

....

[2]

(ii) Calculate the probability that, one Saturday, Arun and Bob both play football.
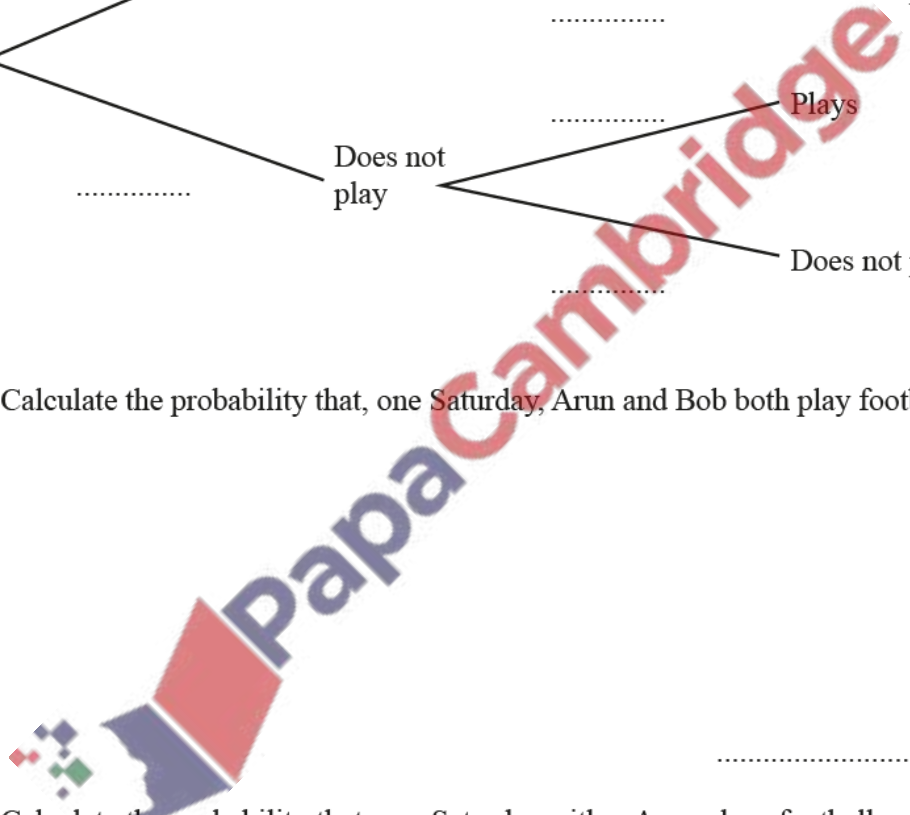
.... [2]

(iii) Calculate the probability that, one Saturday, either Arun plays football or Bob plays football, but not both.

.... [3]

(b) Calculate the probability that Bob plays football for 2 of the next 3 Saturdays.

.... [3]

(c) When Arun plays football, the probability that he scores the winning goal is $\frac{1}{7}$.

Calculate the probability that Arun scores the winning goal one Saturday.

.... [2]