1. Nov/2021/Paper_21/No.5

(a)

| 2 | 2 | 2 | 3 | 4 | 5 | 5 | 6 | 8 | 9 |

Khalid has these 10 number cards.
He takes a card at random, notes the number and replaces it.
He then takes a second card.

(i) Find the probability that the first card Khalid takes shows an even number.

.... [1]

(ii) Complete the tree diagram.

First card   Second card

even number

odd number

even number

odd number

even number

odd number

[2]
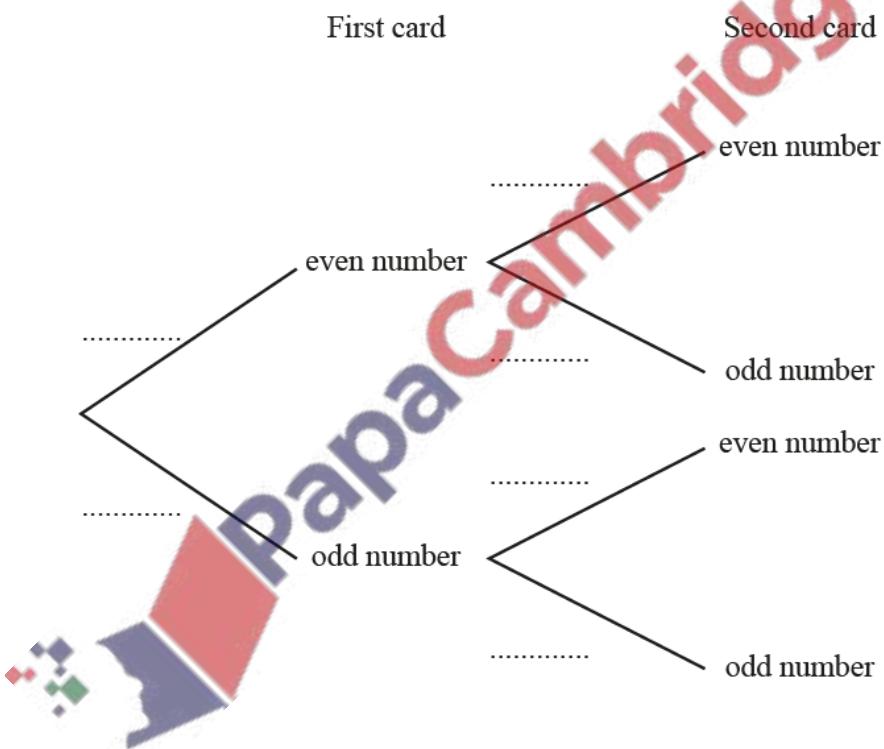
(iii) Work out the probability that Khalid takes one odd number and one even number.

(b) Basma has a bag containing 5 yellow counters, 3 pink counters and 4 black counters.
She takes two counters from the bag at random, without replacement.

Find the probability that she takes one yellow counter and one pink counter.
Give your answer as a fraction in its simplest form.

.... [3]

2.
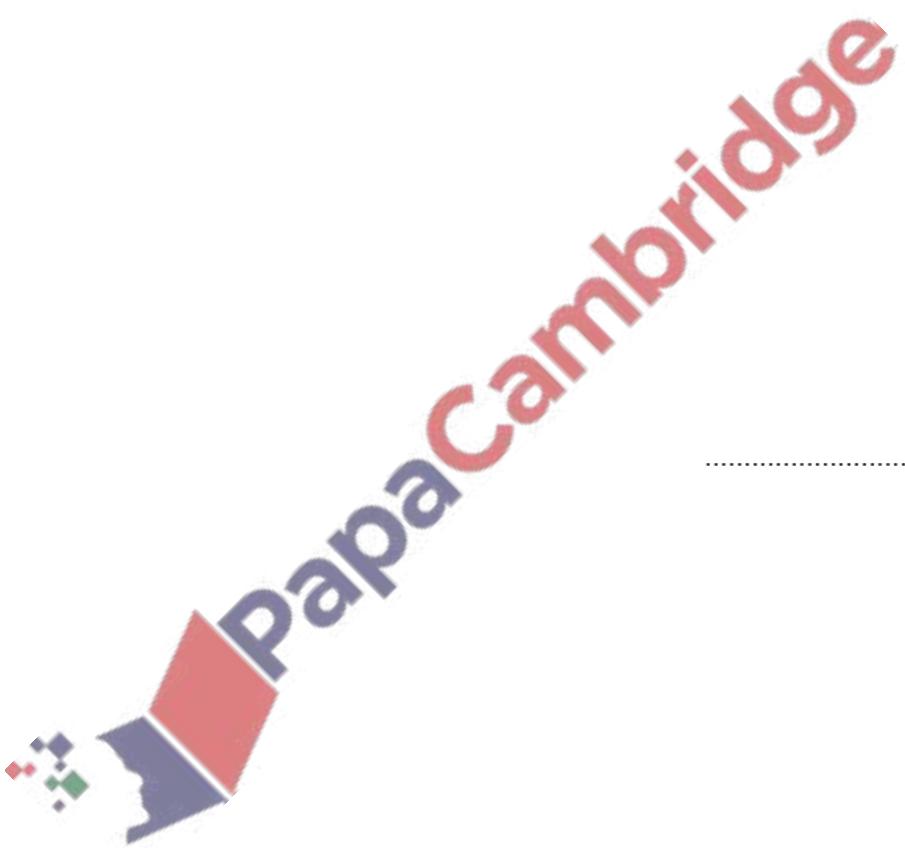
(a)
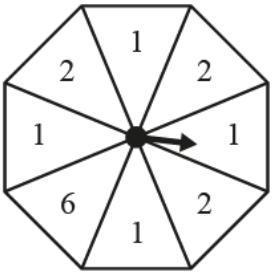
Asma has this fair 8-sided spinner.

(i) She spins the spinner once.

Find the probability that the score is

(a) 6,

.... [1]

(b) not 2.

.... [1]

(ii) Asma spins the spinner twice.

Find the probability that she scores two 2s.

... [2]

3
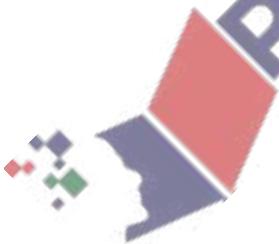
(b) Leon has 7 red counters, 6 green counters and 3 white counters.
He takes two counters at random, without replacement.

Find the probability that the two counters are the same colour.

.... [3]
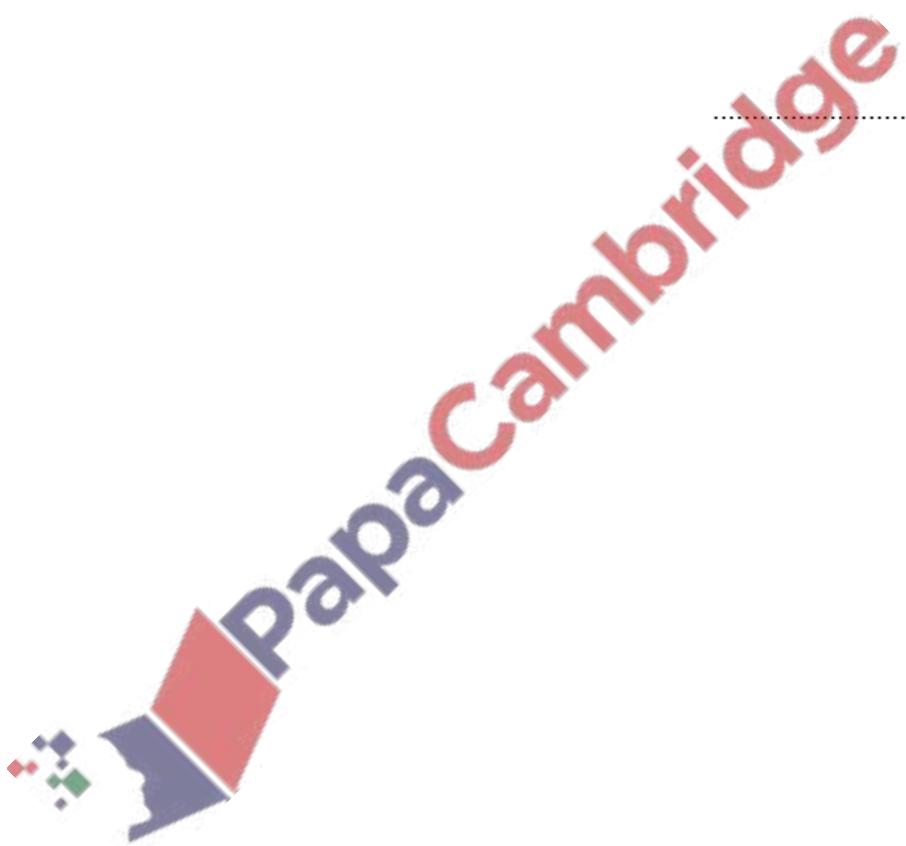
(a) In a survey, 3 out of every 100 women were taller than 1.9 m.
One of these 100 women is picked at random.

Calculate the probability that she is **not** taller than 1.9 m.

.... [1]

(b) A new housing estate is being planned.
There are three possible plans: A, B and C.
A survey was carried out to see which plan people preferred.
The relative frequency table shows the results.

Plan	A	B	C
Relative frequency	0.3	0.5	0.2

52 people preferred plan C.

(i) Find how many people preferred plan A.

.... [2]

(ii) Calculate the total number of people surveyed.

.... [1]

5

A bag contains coloured counters.
A counter is taken from the bag at random.
The table shows the probabilities of taking a counter of each colour.

Colour	Red	Green	Blue	Yellow
Probability	0.15	0.3		0.42

Complete the table. [2]
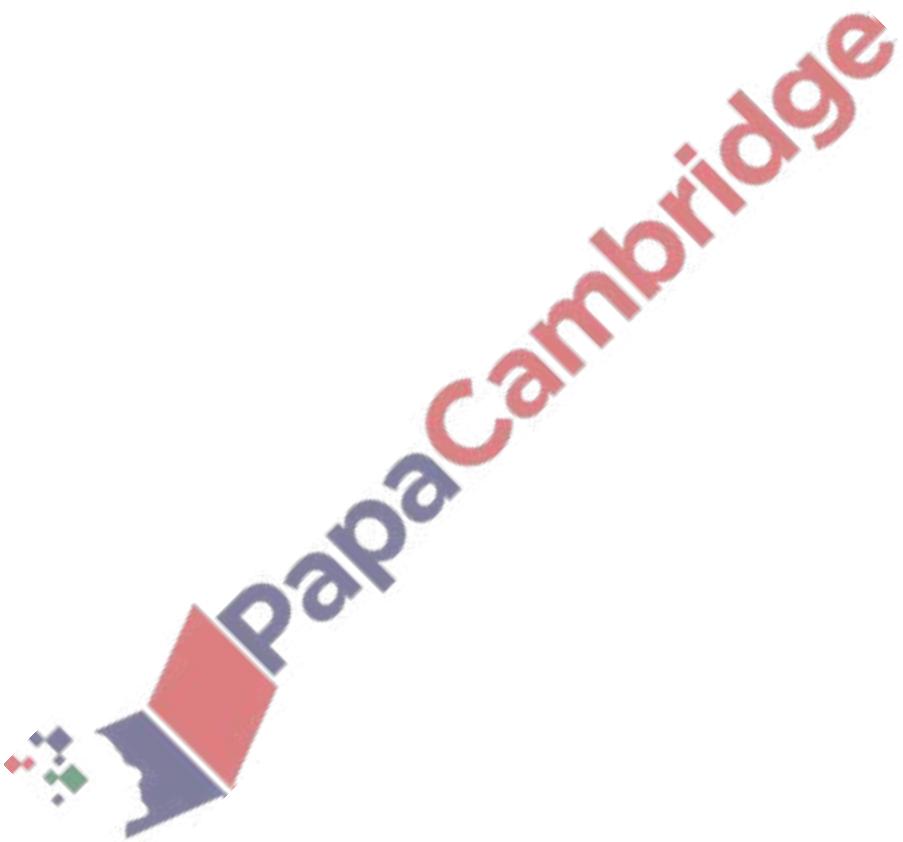
100 adults in a town were surveyed about the number of emails they each received one day.
The table shows the results.

Number of emails	1	2	3	4	5	6	7	8
Number of adults	8	10	22	28	15	9	5	3

(a) Find the mode.

.... [1]

(b) Calculate the mean.

.... [2]

(c) One of these adults is chosen at random.

Find the probability that they received **fewer than** 4 emails that day.
Give your answer as a fraction in its simplest form.
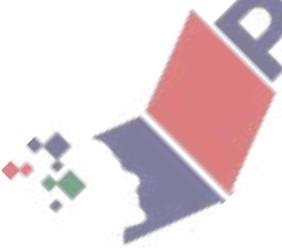
.... [2]

(d) The town has 18 000 adults.

Use the survey results to estimate the number of adults in the town who received exactly 5 emails that day.

.... [2]
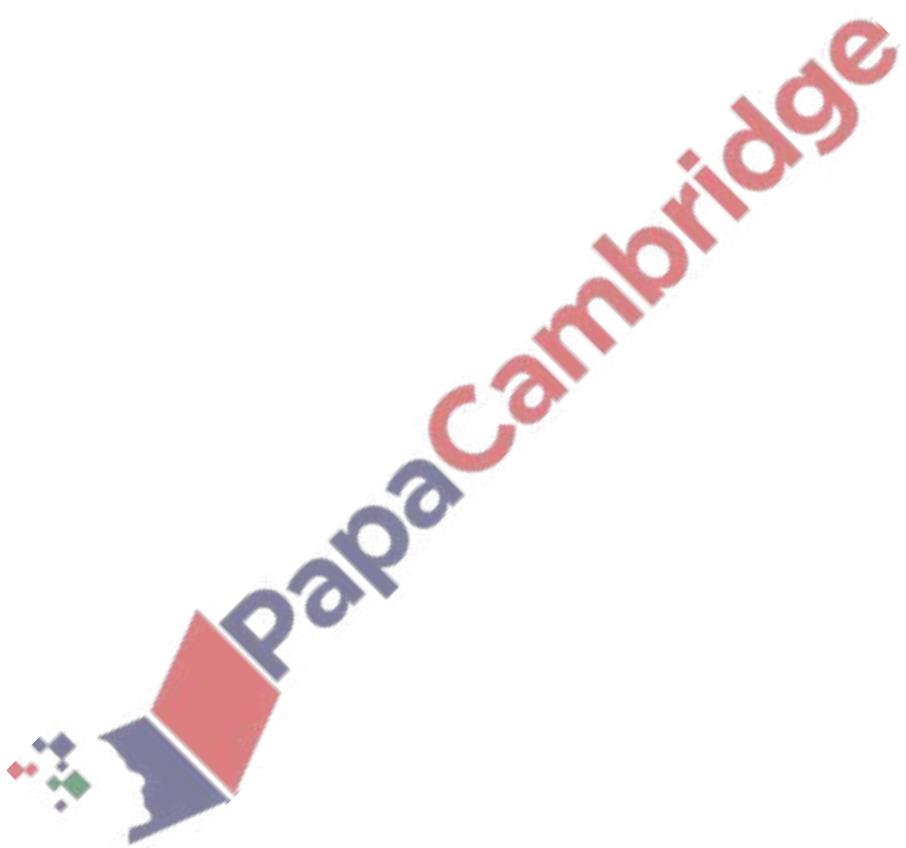
A bag contains 12 balls.
There are x black balls in the bag and the other balls are white.

Two balls are taken at random from the bag without replacement.

(a) Complete the tree diagram.

First ball   Second ball

$\dfrac{x-1}{11}$ black

black

$\dfrac{x}{12}$

....   white

....   black

$\dfrac{12-x}{12}$ white

....   white
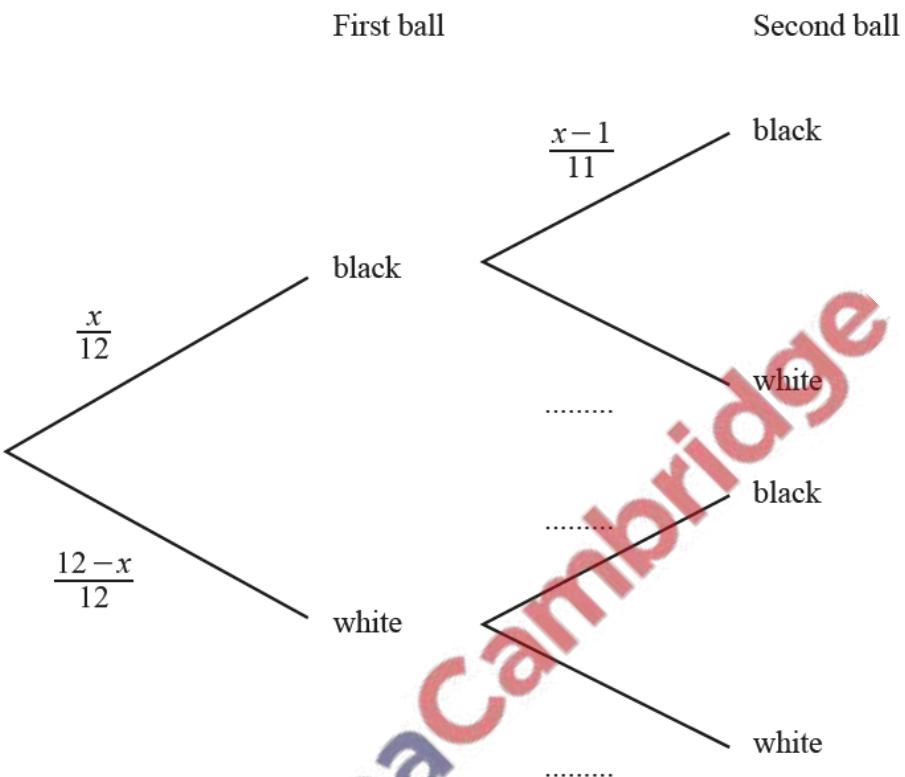
[2]

(b) Find an expression for the probability of taking one ball of each colour.
Write your answer as a single fraction in terms of x.

.... [3]

(c) The probability that both balls are black is $\frac{14}{33}$.

Form an equation in x and solve it to find the number of black balls in the bag.
Show your working.

.... [4]