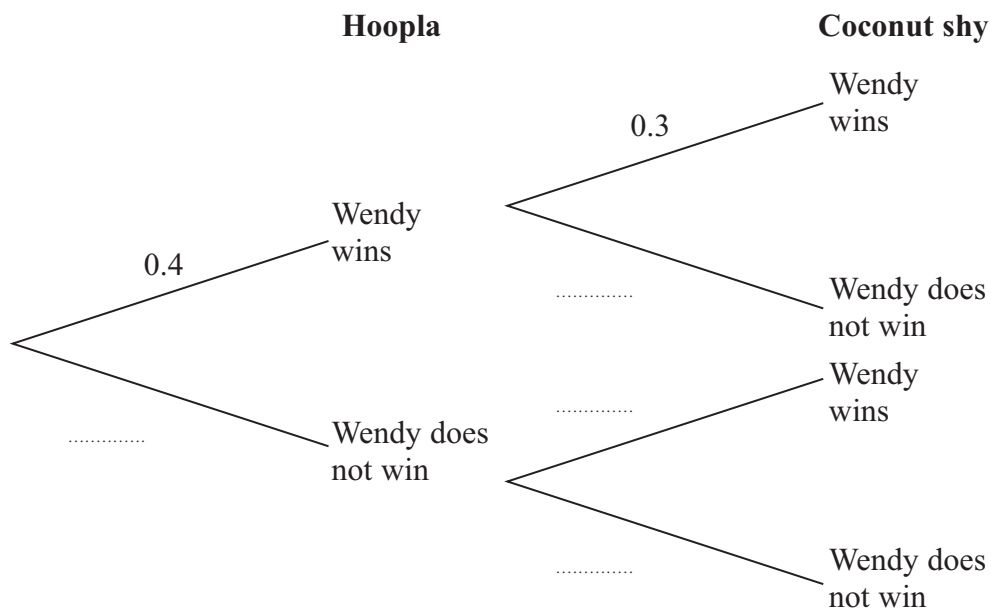**1** Wendy goes to a fun fair.
  She has one go at Hoopla.
  She has one go on the Coconut shy.

  The probability that she wins at Hoopla is 0.4
  The probability that she wins on the Coconut shy is 0.3

  (a) Complete the probability tree diagram.

	Hoopla		**Coconut shy**

  (2)

  (b) Work out the probability that Wendy wins at Hoopla and also wins on the
  Coconut shy.

  ....
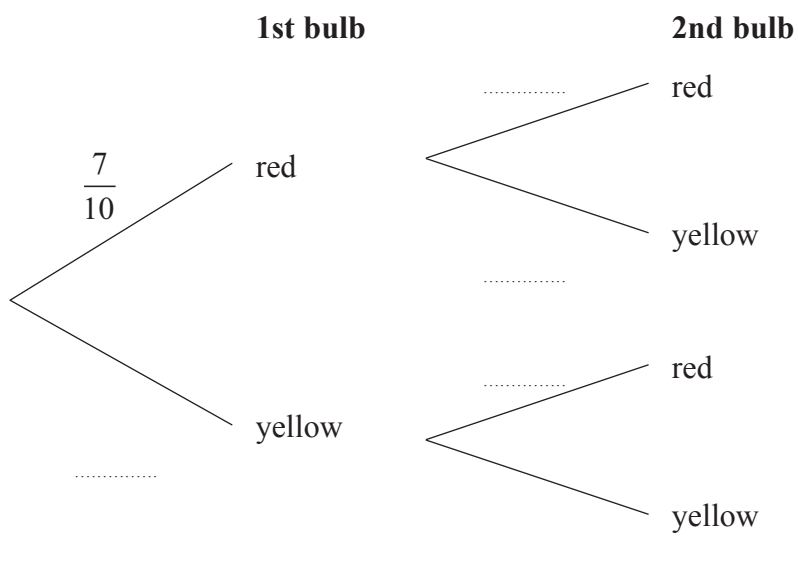 **(2)**

  (Total for Question 1 is 4 marks)

2 Yvonne has 10 tulip bulbs in a bag.

7 of the tulip bulbs will grow into red tulips.
3 of the tulip bulbs will grow into yellow tulips.

Yvonne takes at random two tulip bulbs from the bag.
She plants the bulbs.

(a) Complete the probability tree diagram.

1st bulb		**2nd bulb**

.... red

$\dfrac{7}{10}$ red

.... yellow

.... red

yellow

.... yellow

....

(2)

(b) Work out the probability that at least one of the bulbs will grow into a yellow tulip.

....
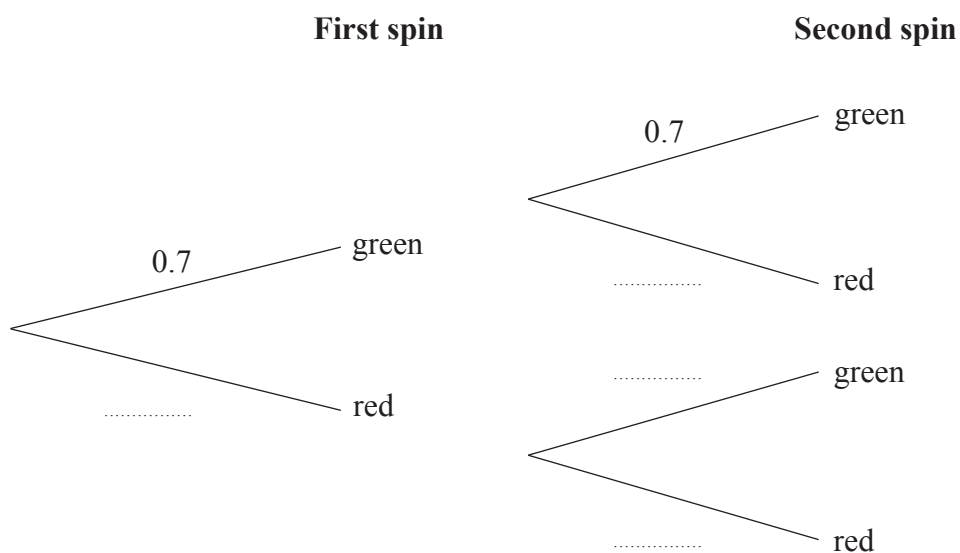
(3)

(Total for Question 2 is 5 marks)

3 Louise makes a spinner.

The spinner can land on green or on red.
The probability that the spinner will land on green is 0.7

Louise spins the spinner twice.

(a) Complete the probability tree diagram.

| **First spin** | | **Second spin** |

```
                                        0.7      green
                                   ┌─────────
                          green    │
            0.7    ┌──────────────┤
                   │               └─────────  red
                   │                .............
        ┌──────────┤
        │          │                .............  green
        │          └──────────────┐
 .............     red             │
                                   └─────────  red
                                    .............
```

(2)

(b) Work out the probability that the spinner lands on two different colours.

..

(3)

(Total for Question 3 is 5 marks)

4 The probability that it will rain on a day in June is 0.2

When it rains the probability that my tennis match is cancelled is 0.7

When it does **not** rain, the probability that my tennis match is **not** cancelled is 0.95

(a) Complete the probability tree diagram for this information.

```
                                    ............            match is
                                                            cancelled
                           rains
        ............                ............            match is not
                                                            cancelled


                                    ............            match is
                                                            cancelled
        ............       does not rain
                                    ............            match is not
                                                            cancelled
```

(3)
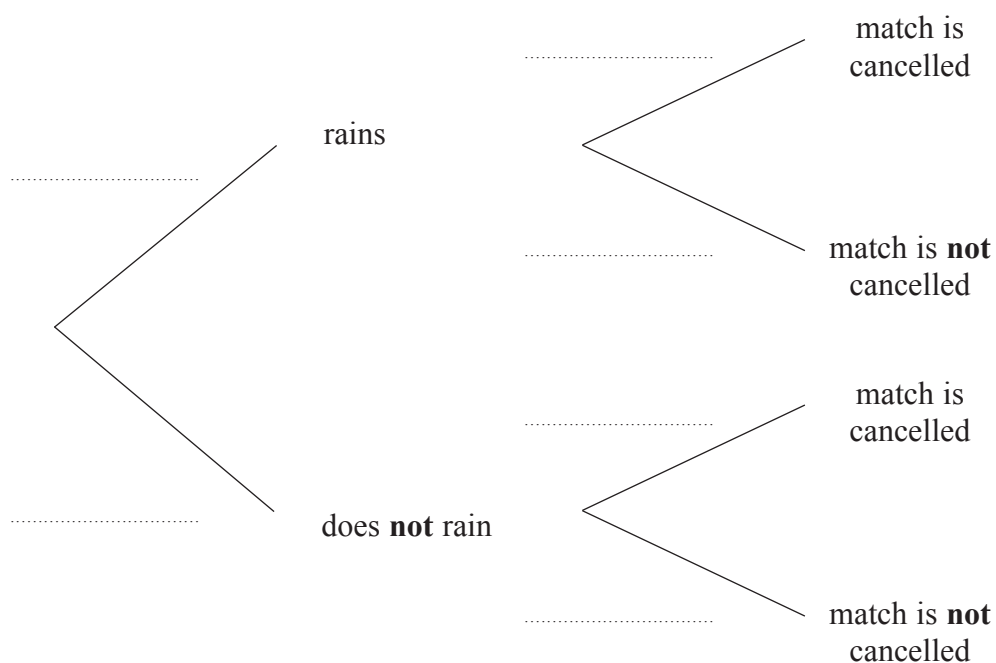
(b) Work out the probability that, on a day in June, it does **not** rain and my tennis match is cancelled.

....
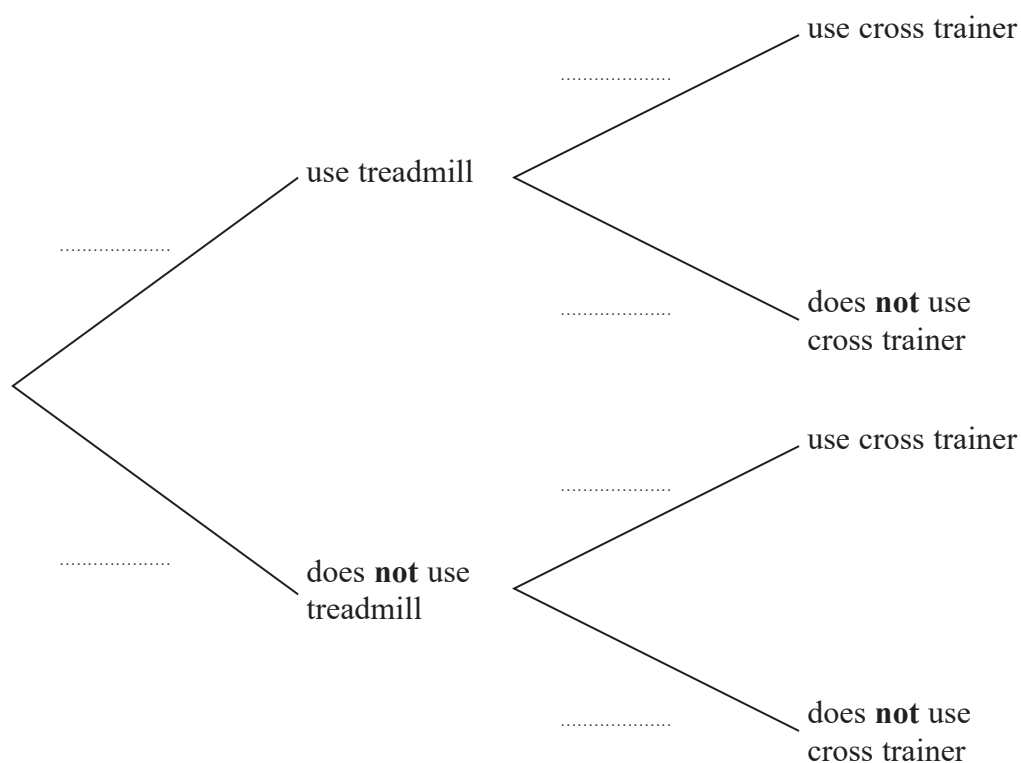
(2)

(Total for Question 4 is 5 marks)

5 Rudolf goes to the gym.

The probability that he will use the treadmill is 0.8

When he uses the treadmill, the probability that he will use the cross trainer is 0.3
When he does **not** use the treadmill, the probability that he will use the cross trainer is 0.6

(a) Complete the probability tree diagram for this information.

```
                                              ................
                                                          use cross trainer
                      use treadmill  <
     ................                          ................
                                                          does not use
                                                          cross trainer

                                              ................
                                                          use cross trainer
     ................   does not use  <
                       treadmill                ................
                                                          does not use
                                                          cross trainer
```

(2)

(b) Work out the probability that Rudolf uses both the treadmill and the cross trainer.

....

(2)

(Total for Question 5 is 4 marks)

6 There are two bags of counters, bag **X** and bag **Y**.
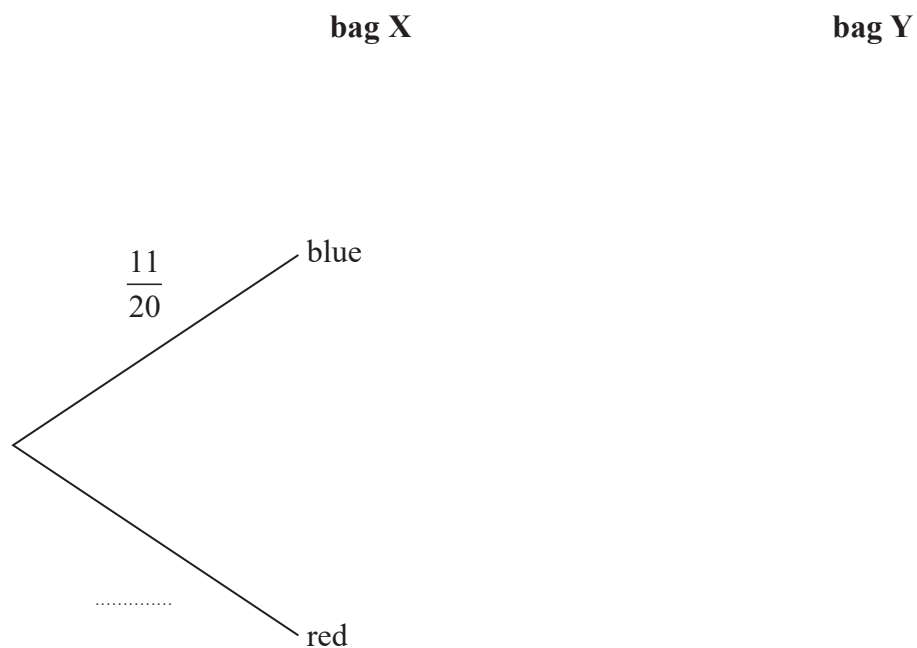
There are 20 counters in bag **X**.
11 of the counters are blue and the rest are red.

There are 16 counters in bag **Y**.
9 of the counters are blue and the rest are red.

Arkady takes at random a counter from bag **X** and takes at random a counter from bag **Y**.

(a) Complete the probability tree diagram.

bag X   **bag Y**

$\frac{11}{20}$ — blue

.... — red

(3)

(b) Work out the probability that the two counters are both red.

....
(2)

(c) Work out the probability that the two counters are both red or are both blue.

....
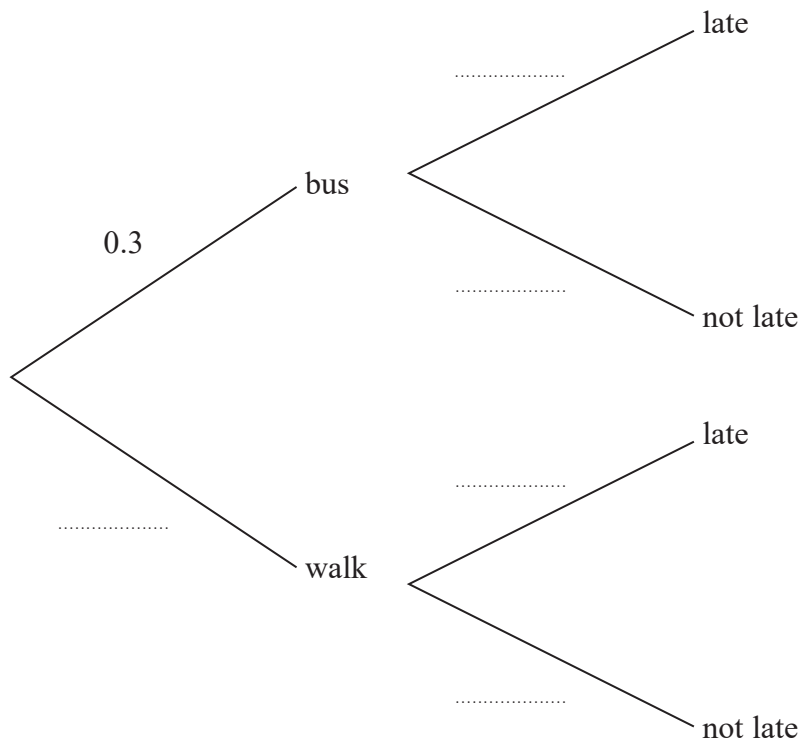**(3)**

(Total for Question 6 is 8 marks)

7 Each day that Barney goes to college, he either goes by bus or he walks.
The probability that Barney will go to college by bus on any day is 0.3

When Barney goes to college by bus, the probability that he will be late is 0.2
When Barney walks to college, the probability that he will be late is 0.1

(a) Complete the probability tree diagram.

```
                                              ............... late
                                        bus <
                              0.3  /          ............... not late
                                  /
                                  \
                                   \          ............... late
                      ...............  walk <
                                              ............... not late
```

(2)

Barney will go to college on 200 days next year.

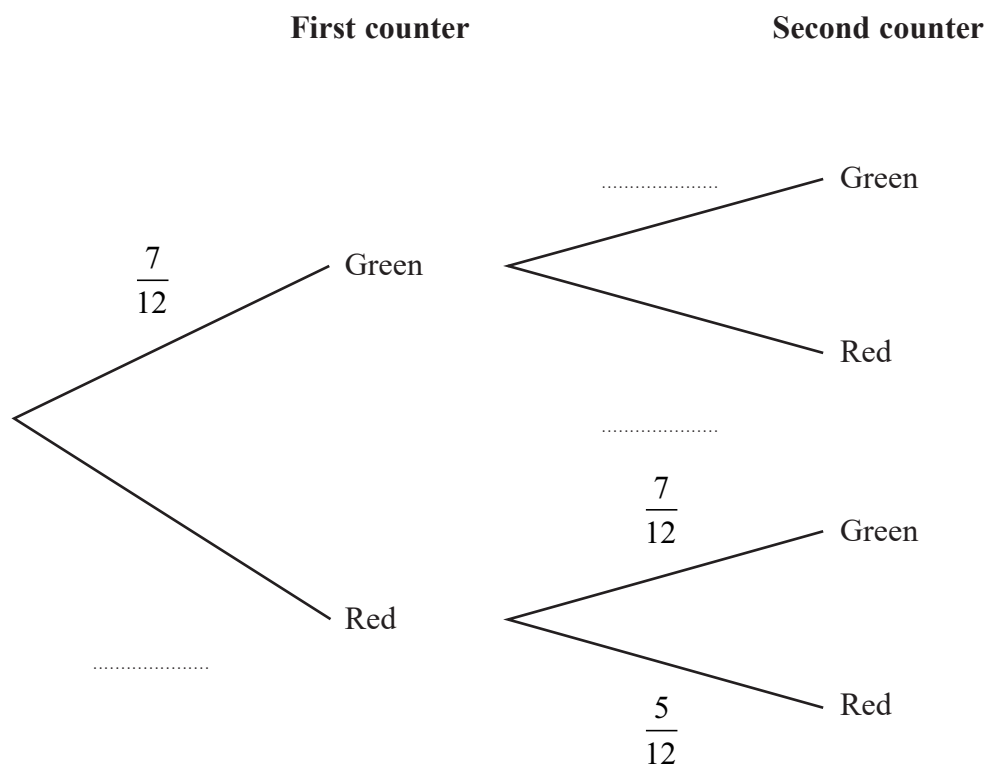(b) Work out an estimate for the number of days Barney will be late for college next year.

....

(4)

(Total for Question 7 is 6 marks)

8 Hector has a bag that contains 12 counters.
There are 7 green counters and 5 red counters in the bag.

Hector takes at random a counter from the bag.
He looks at the counter and puts the counter back into the bag.

Hector then takes at random a second counter from the bag.
He looks at the counter and puts the counter back into the bag.

(a) Complete the probability tree diagram.

First counter   **Second counter**

.... Green

$\dfrac{7}{12}$ Green

.... Red

....

$\dfrac{7}{12}$ Green

Red

$\dfrac{5}{12}$ Red

....

(2)

(b) Work out the probability that both counters are red.

....

(2)

Meghan has a jar containing 15 counters.
There are only blue counters, green counters and red counters in the jar.

Hector is going to take at random one of the counters from his bag of 12 counters.
He will look at the counter and put the counter back into the bag.

Hector is then going to take at random a second counter from his bag.
He will look at the counter and put the counter back into the bag.

Meghan is then going to take at random one of the counters from her jar of counters.
She will look at the counter and put the counter back into the jar.

The probability that the 3 counters each have a different colour is $\dfrac{7}{24}$

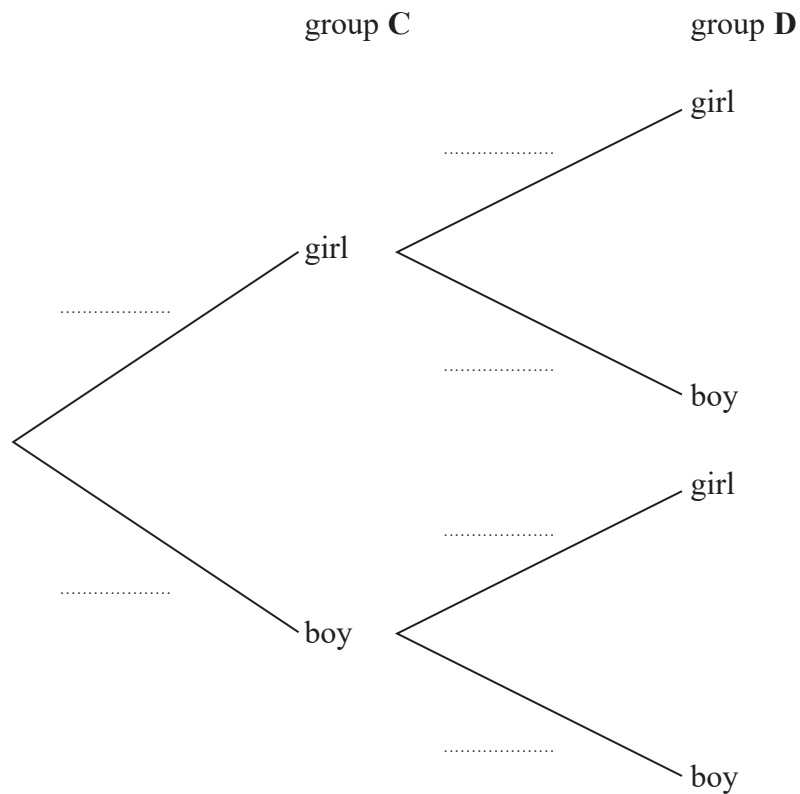(c) Work out how many blue counters there are in the jar.

....

(3)

(Total for Question 8 is 7 marks)

9 In group **C**, there are 6 girls and 8 boys.
In group **D**, there are 3 girls and 7 boys.

A team is made by picking at random one child from group **C** and one child from group **D**.

(a) Complete the probability tree diagram.

group **C**   group **D**

                                    girl
                ....
        girl
....
                ....
                                    boy

                                    girl
                ....
        boy
....
                ....
                                    boy

(2)

(b) Work out the probability that there are two boys in the team.
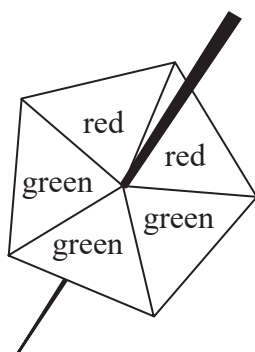
....

(2)

After the first team has been picked, a second team is picked.
One child is picked at random from the children left in group **C** and one child is picked at random from the children left in group **D**.

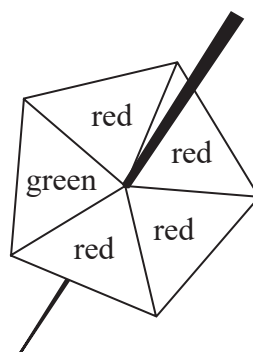(c) Work out the probability that there are two boys in each of the two teams.

....

(Total for Question 9 is 7 marks)

10 Harry has two fair 5-sided spinners.
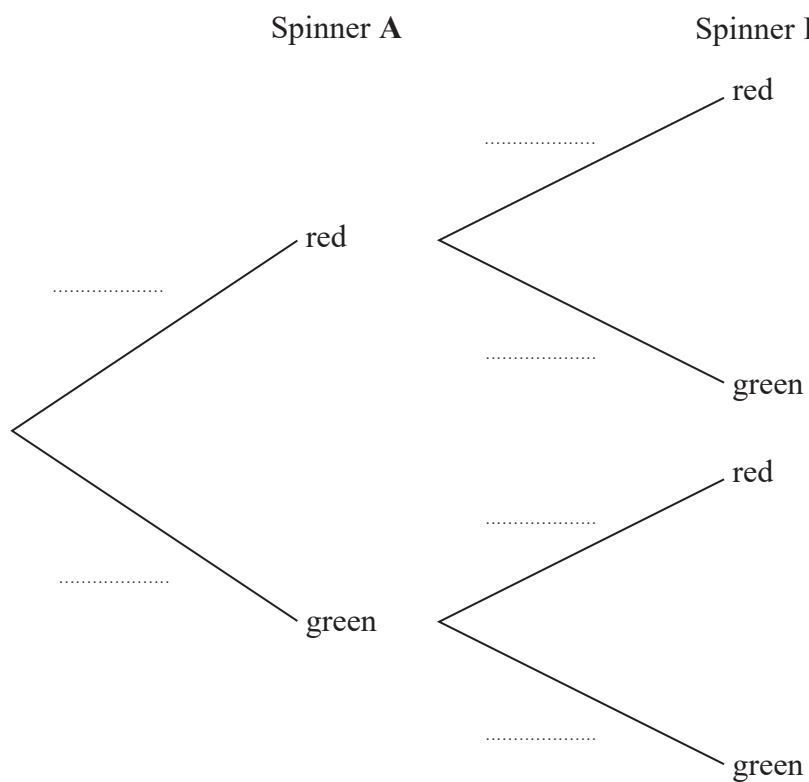

Spinner **A**   Spinner **B**

Harry is going to spin each spinner once.
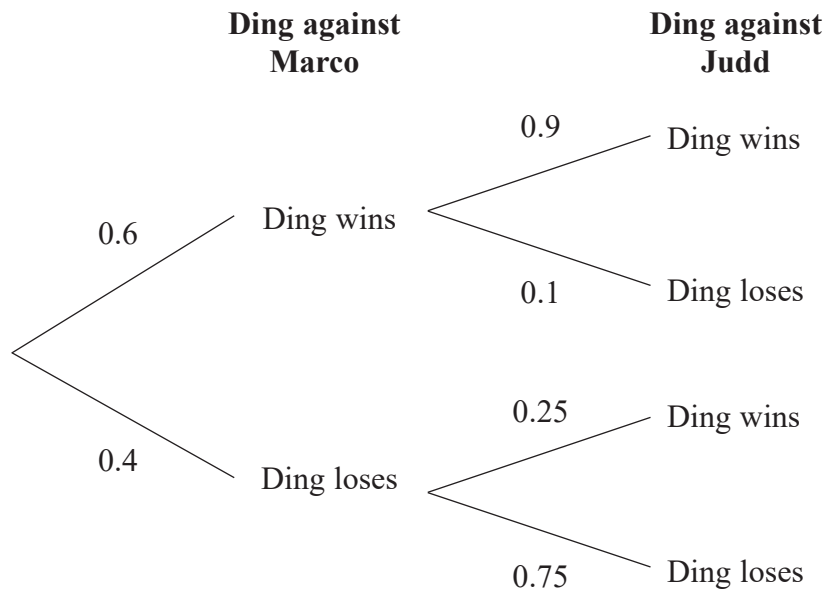
(a) Complete the probability tree diagram.

Spinner **A**   Spinner **B**

red

....

red

....

green

....

....

red

....

green

....

green

(2)

(b) Work out the probability that at least one of the spinners will land on green.

....

(3)

(Total for Question 10 is 5 marks)

11 Ding is going to play one game of snooker against each of two of his friends, Marco and Judd.

The probability tree diagram gives information about the probabilities that Ding will win or lose each of these two games.

<div align="center">

Ding against Marco   **Ding against Judd**

</div>

```
                                        0.9      Ding wins
                    Ding wins  ─────────<
              0.6  /                     0.1      Ding loses
                  /
                 <
                  \  0.4                  0.25     Ding wins
                    Ding loses ──────────<
                                         0.75     Ding loses
```

(a) Work out the probability that Ding will win both games.

....

(2)

(b) Work out the probability that Ding will win exactly one of the games.

....
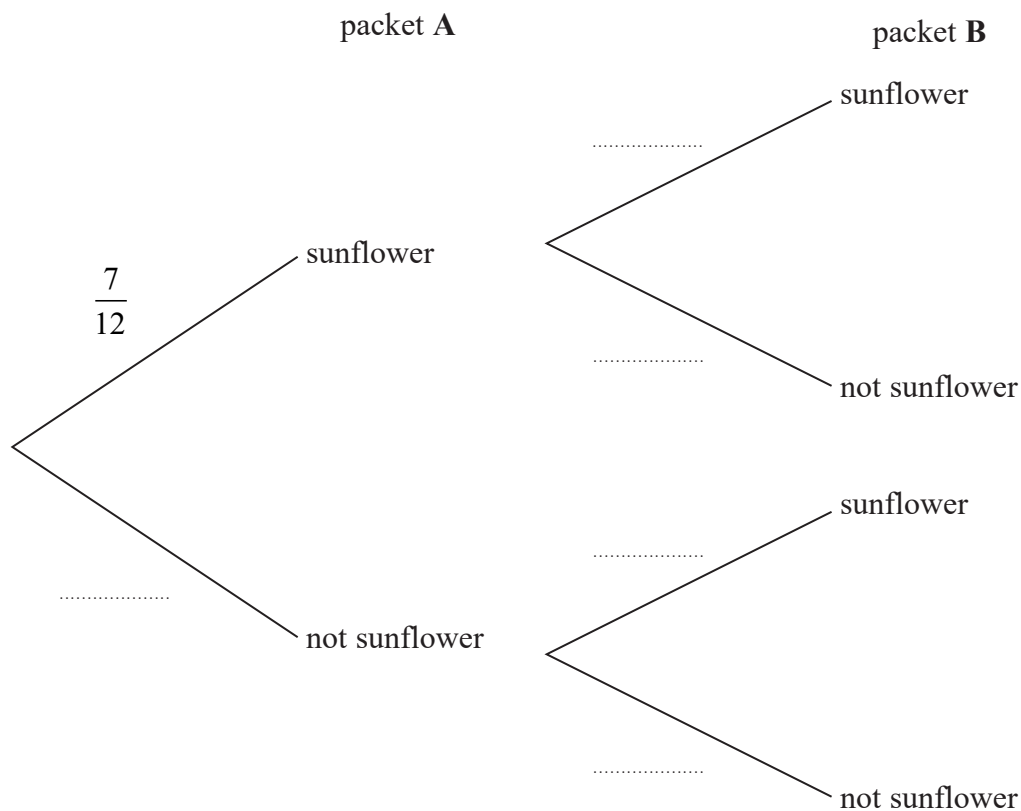
(3)

(Total for Question 11 is 5 marks)

12 Aika has 2 packets of seeds, packet **A** and packet **B**

There are 12 seeds in packet **A** and 7 of these are sunflower seeds.
There are 15 seeds in packet **B** and 8 of these are sunflower seeds.

Aika is going to take at random a seed from packet **A** and a seed from packet **B**

(a) Complete the probability tree diagram.

packet **A**   packet **B**

$\frac{7}{12}$ sunflower

....   sunflower

....   not sunflower

....   not sunflower

....   sunflower

....   not sunflower

(2)

(b) Calculate the probability that Aika will take two sunflower seeds.

....

(2)

(Total for Question 12 is 4 marks)

**13** Cody has two bags of counters, bag **A** and bag **B**.

Each of the counters has either an odd number or an even number written on it.

There are 10 counters in bag **A** and 7 of these counters have an **odd** number written on them.
There are 12 counters in bag **B** and 7 of these counters have an **odd** number written on them.

Cody is going to take at random a counter from bag **A** and a counter from bag **B**.

(a) Complete the probability tree diagram.

(2)
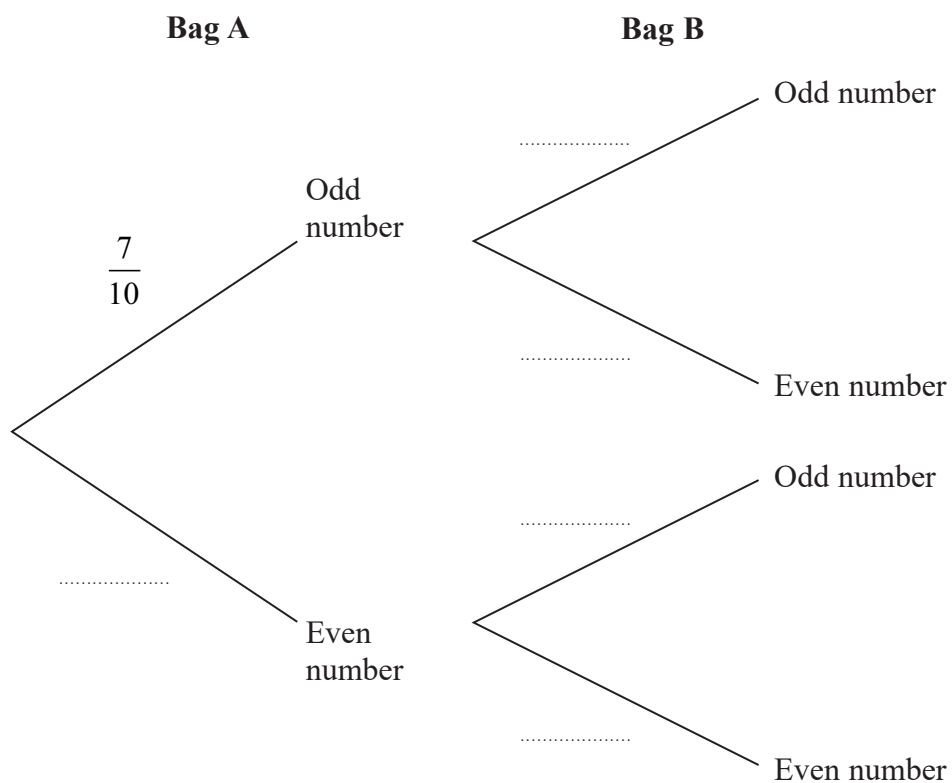
(b) Calculate the probability that the total of the numbers on the two counters will be an odd number.

....
(3)

Harriet also has a bag of counters.
Each of her counters also has either an odd number or an even number written on it.

Harriet is going to take at random a counter from her bag of counters.

The probability that the number on each of Cody's two counters **and** the number on Harriet's counter will all be even is $\dfrac{3}{100}$

(c) Find the least number of counters that Harriet has in her bag.
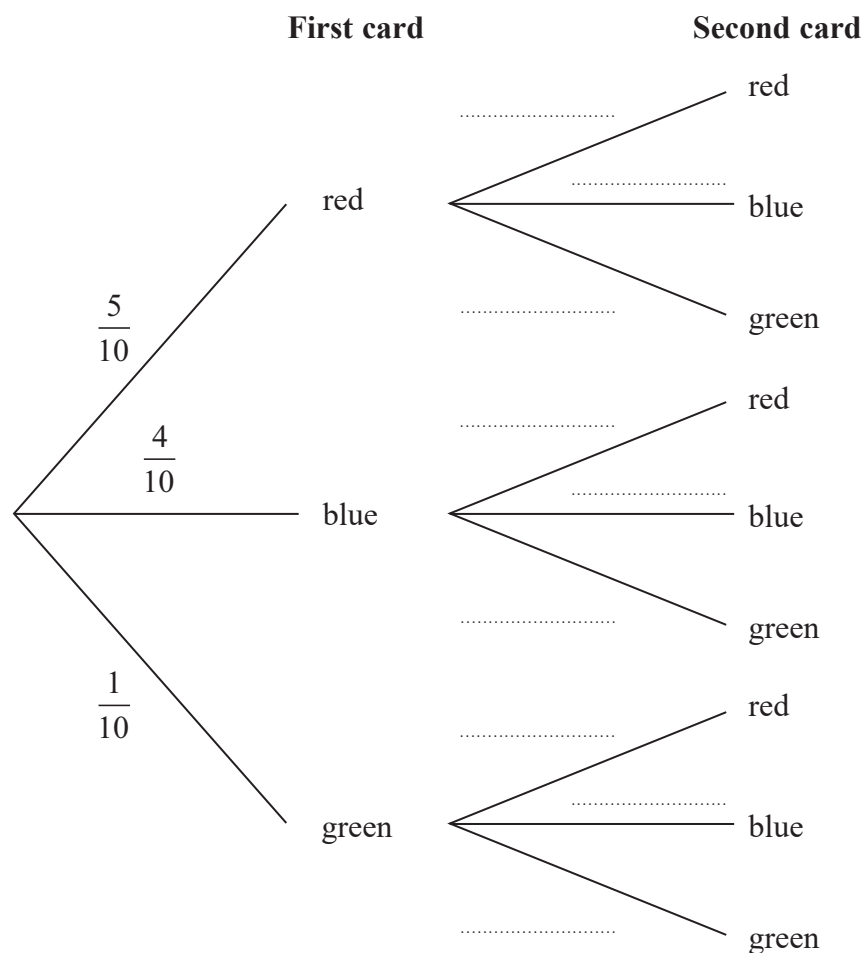Show your working clearly.

....
(3)

(Total for Question 13 is 8 marks)

14 Felix has 10 cards.
There are 5 red cards, 4 blue cards and 1 green card.

Felix takes at random one of the cards.
He does not replace the card.
Felix then takes at random a second card.

(a) Complete the probability tree diagram.

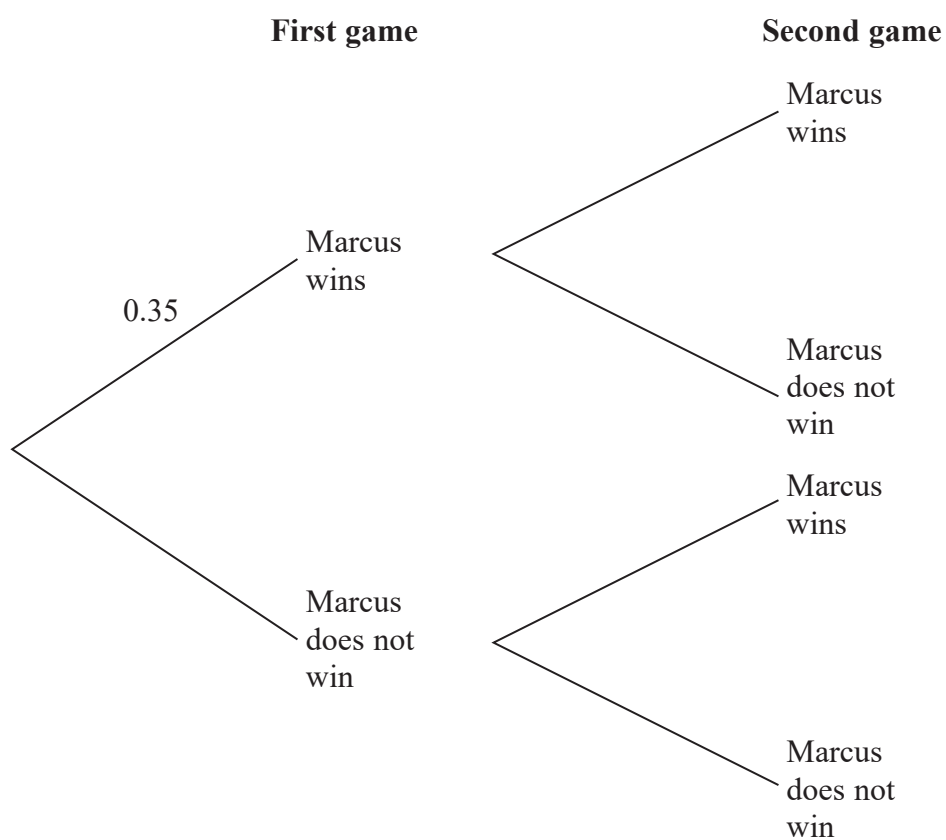**First card**   **Second card**

(2)

(b) Work out the probability that Felix takes at least one blue card and no green card.

....

(3)

(Total for Question 14 is 5 marks)

15 Marcus plays two games of tennis.
For each game, the probability that Marcus wins is 0.35

(a) Complete the probability tree diagram.

First game	Second game
0.35 Marcus wins	Marcus wins
	Marcus does not win
Marcus does not win	Marcus wins
	Marcus does not win

(2)

(b) Work out the probability that Marcus wins at least one of the two games of tennis.

(3)

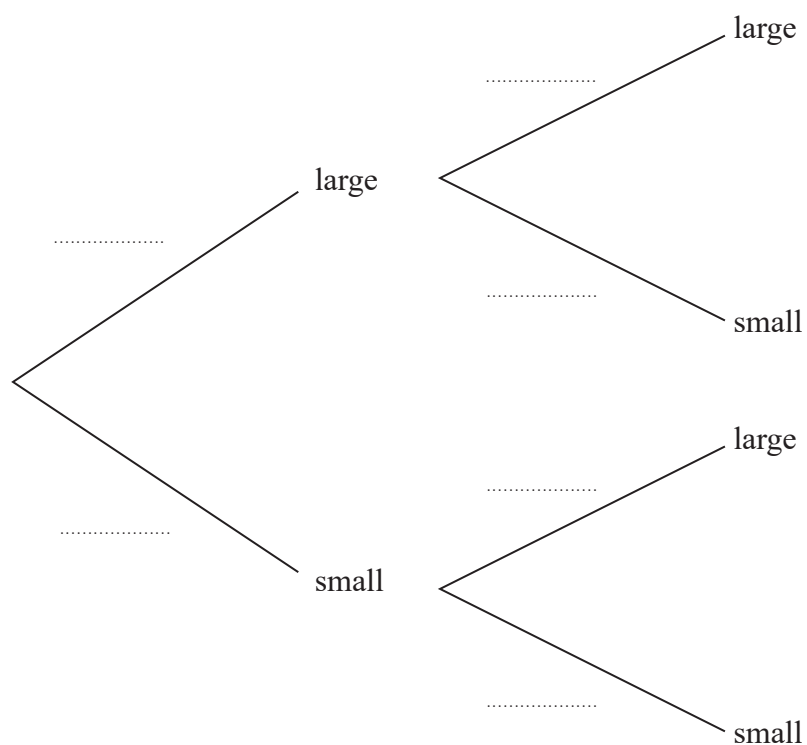**(Total for Question 15 is 5 marks)**

16 There are 20 glasses in a cupboard.

       13 of the glasses are large
       7 of the glasses are small

Roberto takes at random two glasses from the cupboard.

(a) Complete the probability tree diagram.

```
                                          ............... large
                              large  <
                  ...............          ............... small

                  ...............          ............... large
                              small <
                                          ............... small
```

(2)

(b) Work out the probability that Roberto takes two small glasses.

....
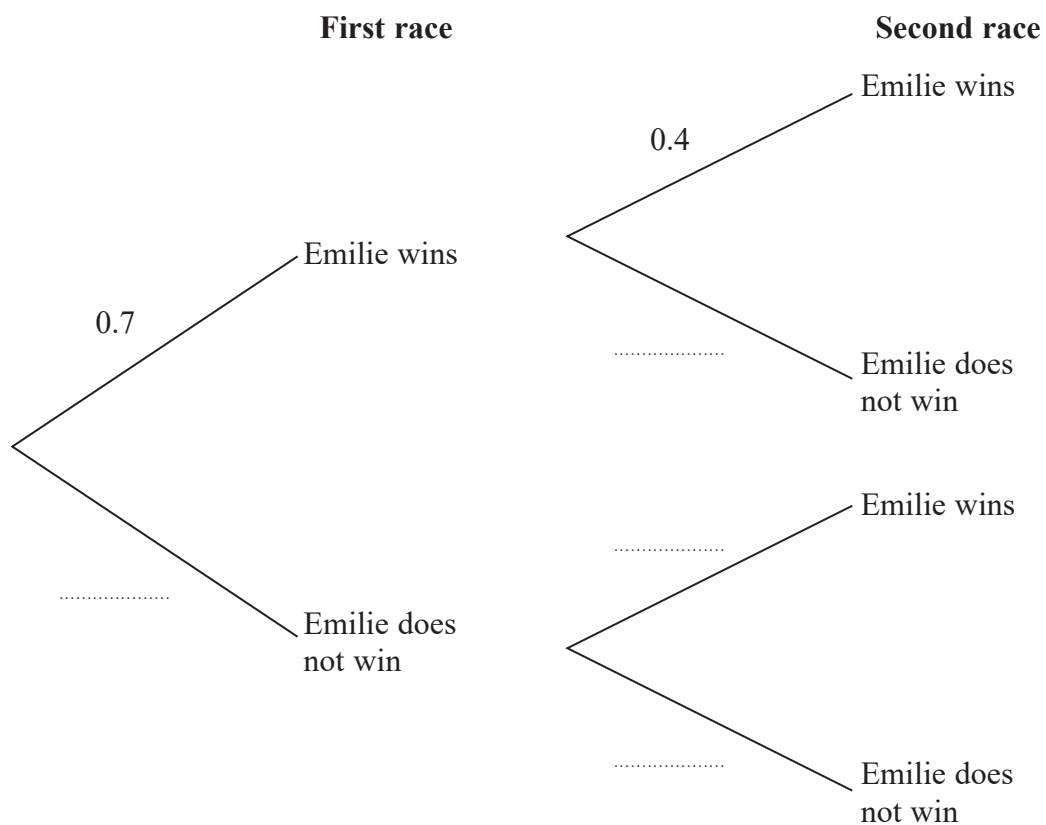
(2)

(Total for Question 16 is 4 marks)

17 Emilie takes part in two races.

The probability that she wins the first race is 0.7
The probability that she wins the second race is 0.4
The outcomes of the two races are independent.

(a) Complete the probability tree diagram.

First race   **Second race**

                                                    Emilie wins
                                          0.4
                    Emilie wins
          0.7
                                          ....   Emilie does
                                                            not win

                                          ....   Emilie wins
                    Emilie does
          ....   not win
                                          ....   Emilie does
                                                            not win

(2)

(b) Work out the probability that Emilie wins exactly one of the two races.

....

(3)

Emilie is going to take part in a third race.

If she wins both of the first two races, the probability that she will win the third race is 0.6

If she wins exactly one of the first two races, the probability that she will win the third race is 0.3

(c) Work out the probability that Emilie will win exactly two of the three races.

....

(3)

(Total for Question 17 is 8 marks)