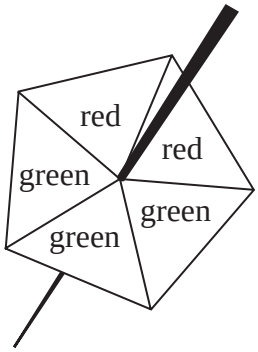
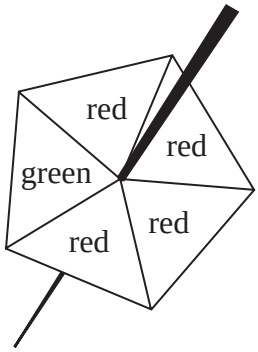
1 Harry has two fair 5-sided spinners.



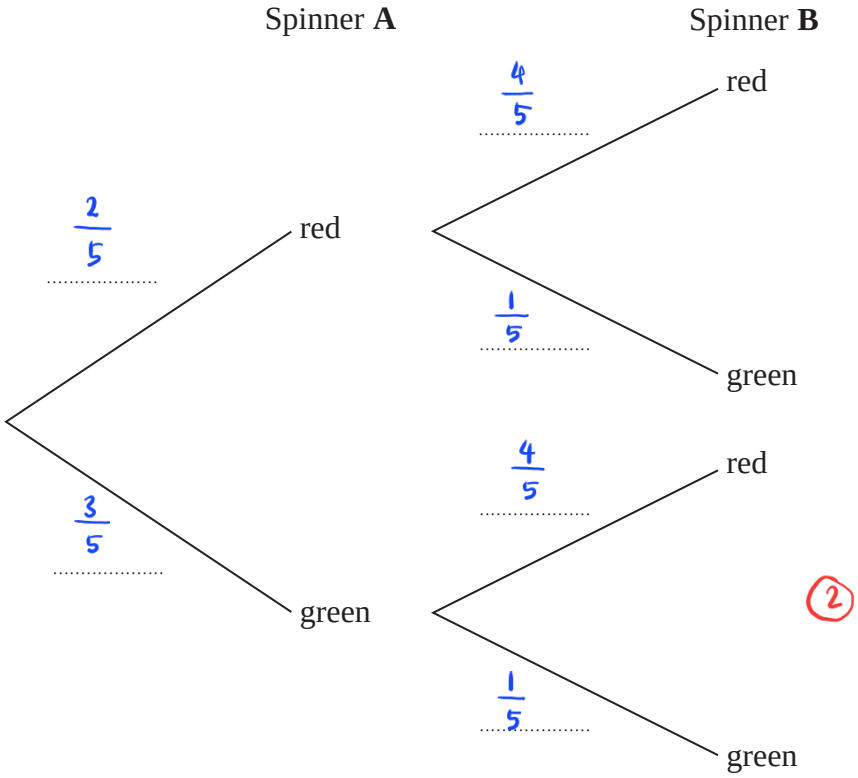
Spinner **A**



Spinner **B**

Harry is going to spin each spinner once.

(a) Complete the probability tree diagram.



(2)

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

P(both green) = $\frac{3}{5} \times \frac{1}{5} = \frac{3}{25}$

P(A red, B green) = $\frac{2}{5} \times \frac{1}{5} = \frac{2}{25}$ (1)

P(A green, B red) = $\frac{3}{5} \times \frac{4}{5} = \frac{12}{25}$

P(at least one spinner lands on green) = $\frac{3}{25} + \frac{2}{25} + \frac{12}{25}$ (1)

= $\frac{17}{25}$ (1)

$\frac{17}{25}$

(3)

(Total for Question 1 is 5 marks)

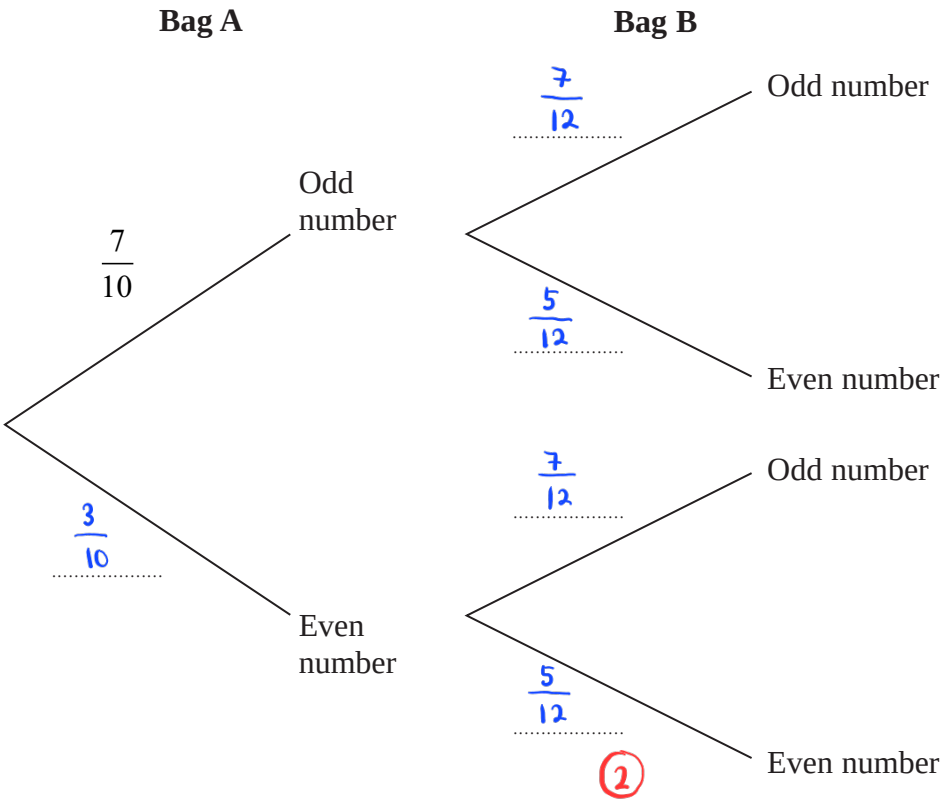
2 Cody has two bags of counters, bag **A** and bag **B**.

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)

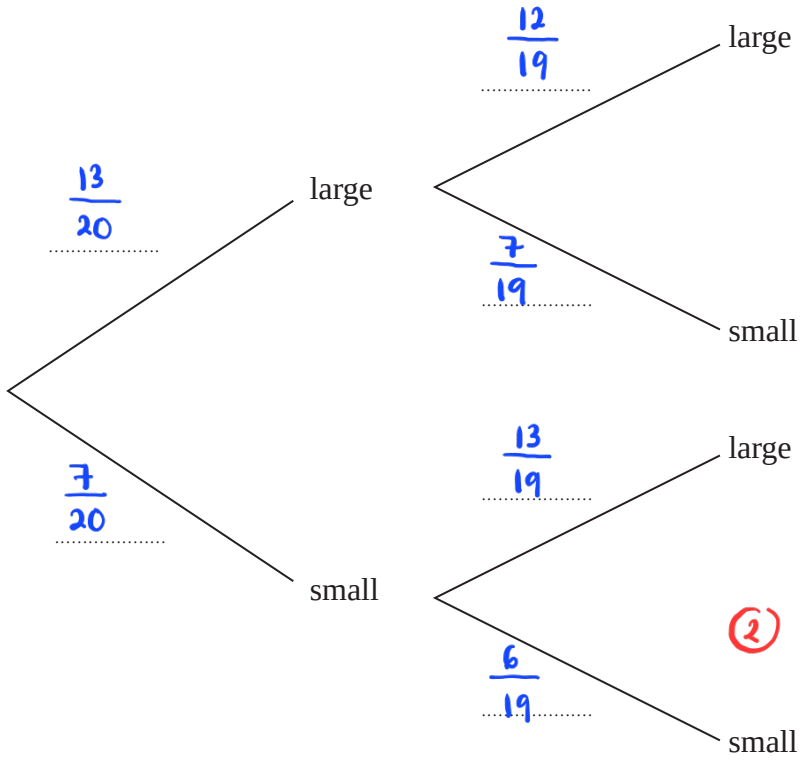
(Total for Question 2 is 2 marks)

3 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.



(2)

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

$\frac{7}{20} \times \frac{6}{19} = \frac{21}{190}$ (1)

(1)

$\frac{21}{190}$

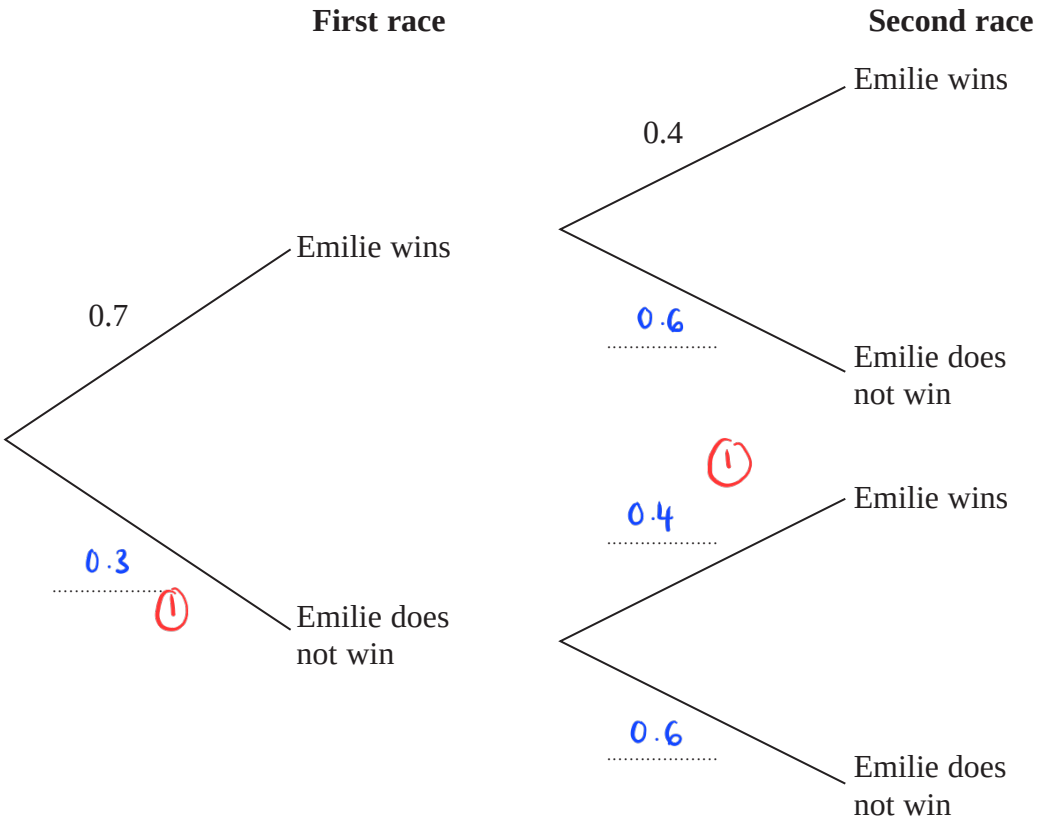
(2)

(Total for Question 3 is 4 marks)

4 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.



(2)

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

P(win race 1, lose race 2) = 0.7 × 0.6
= 0.42

P(lose race 1, win race 2) = 0.3 × 0.4 (1)
= 0.12

Total = 0.42 + 0.12 (1)
= 0.54 (1)

0.54

(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.

P(wins first 2 races, lose race 3) = $0.7 \times 0.4 \times (1-0.6)$

$= 0.7 \times 0.4 \times 0.4$

$= 0.112$

P(wins 1 of first 2 races, wins race 3) = 0.54×0.3

$= 0.162$ (1)

Total : $0.112 + 0.162$ (1)

$= 0.274$ (1)

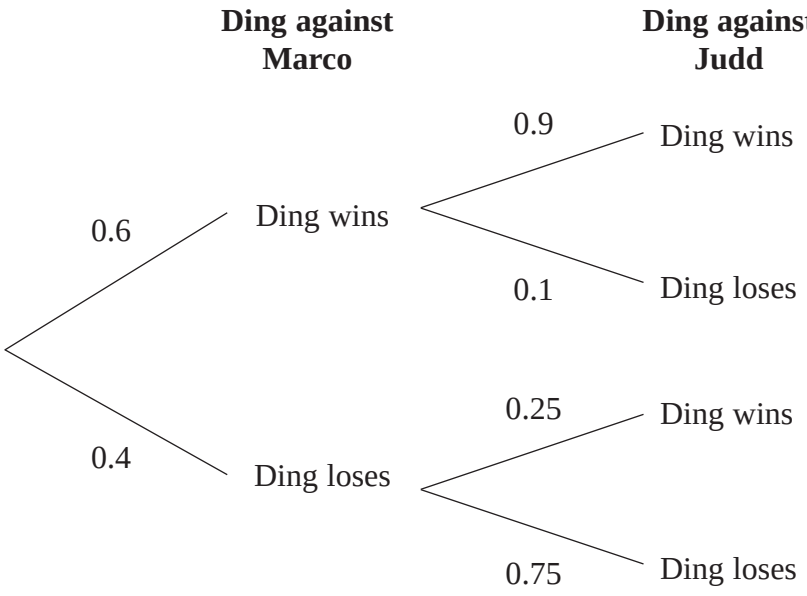
0.274

(3)

(Total for Question 4 is 8 marks)

5 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.



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

P(win, win) = 0.6 × 0.9 (1)
= 0.54 (1)

0.54

(2)

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

= P(win, lose) + P(lose, win)
= (0.6 × 0.1) + (0.4 × 0.25) (1)
= 0.06 + 0.1 (1)
= 0.16 (1)

0.16

(3)

(Total for Question 5 is 5 marks)

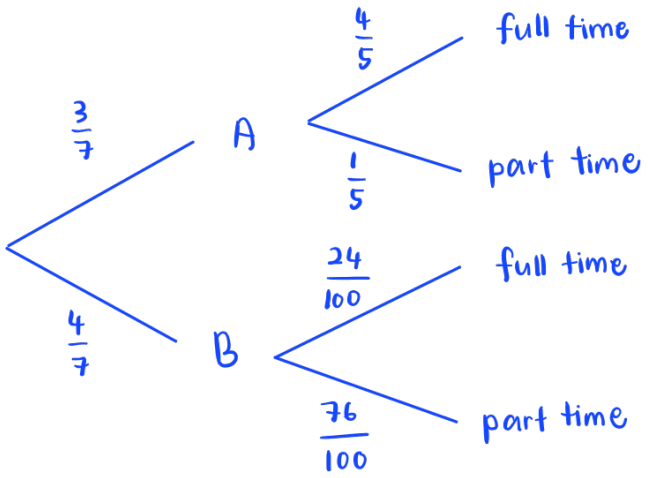
6 The people working for a company work in Team A or in Team B.

number of people in Team A : number of people in Team B = 3 : 4

$\frac{4}{5}$ of Team A work full time.

24% of Team B work full time.

Work out what fraction of the people working for the company work full time.
Give your fraction in its simplest form.



Team A full time = $\frac{3}{7} \times \frac{4}{5}$

$= \frac{12}{35}$ (1)

Team B full time = $\frac{4}{7} \times \frac{24}{100}$

$= \frac{24}{175}$ (1)

Total people working full time = $\frac{12}{35} + \frac{24}{175} = \frac{12}{25}$

$\frac{12}{25}$ (1)

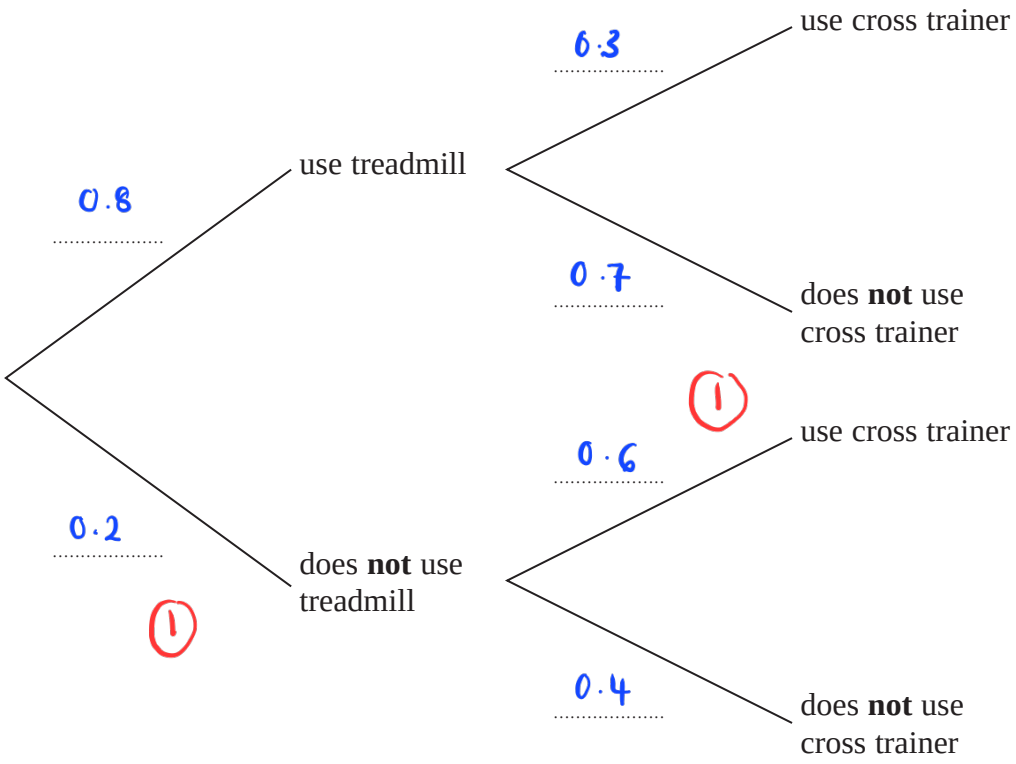
(Total for Question 6 is 3 marks)

7 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.



(2)

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

$0.8 \times 0.3 = 0.24$
1 1

0.24

(2)

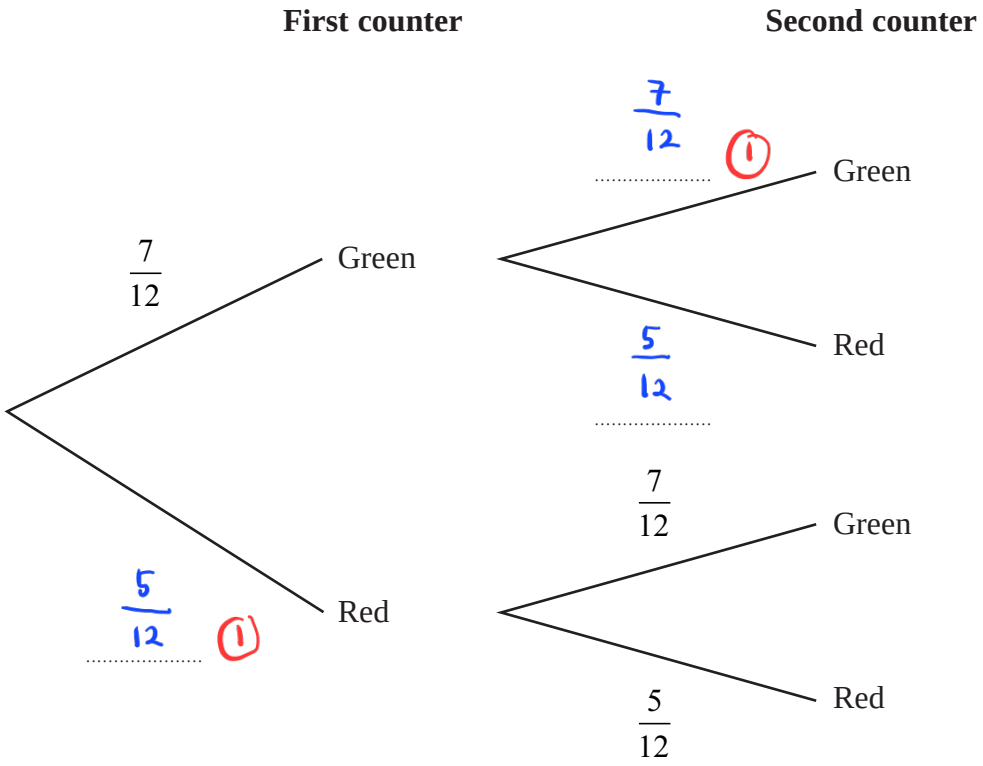
(Total for Question 7 is 4 marks)

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.



(2)

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

$\frac{5}{12} \times \frac{5}{12} = \frac{25}{144}$

$\frac{25}{144}$

(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 $\frac{7}{24}$

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

(1) RG and GR : $\frac{7}{12} \times \frac{5}{12} \times 2$ (1)

P(B) from jar

(1) and blue : $2 \times \frac{7}{12} \times \frac{5}{12} \times y = \frac{7}{24}$

$y = \frac{\frac{7}{24}}{2 \times \frac{7}{12} \times \frac{5}{12}} = \frac{3}{5}$ (1)

$\frac{3}{5} \times 15$ counters = 9 blue counters (1)

9

.....

(3)

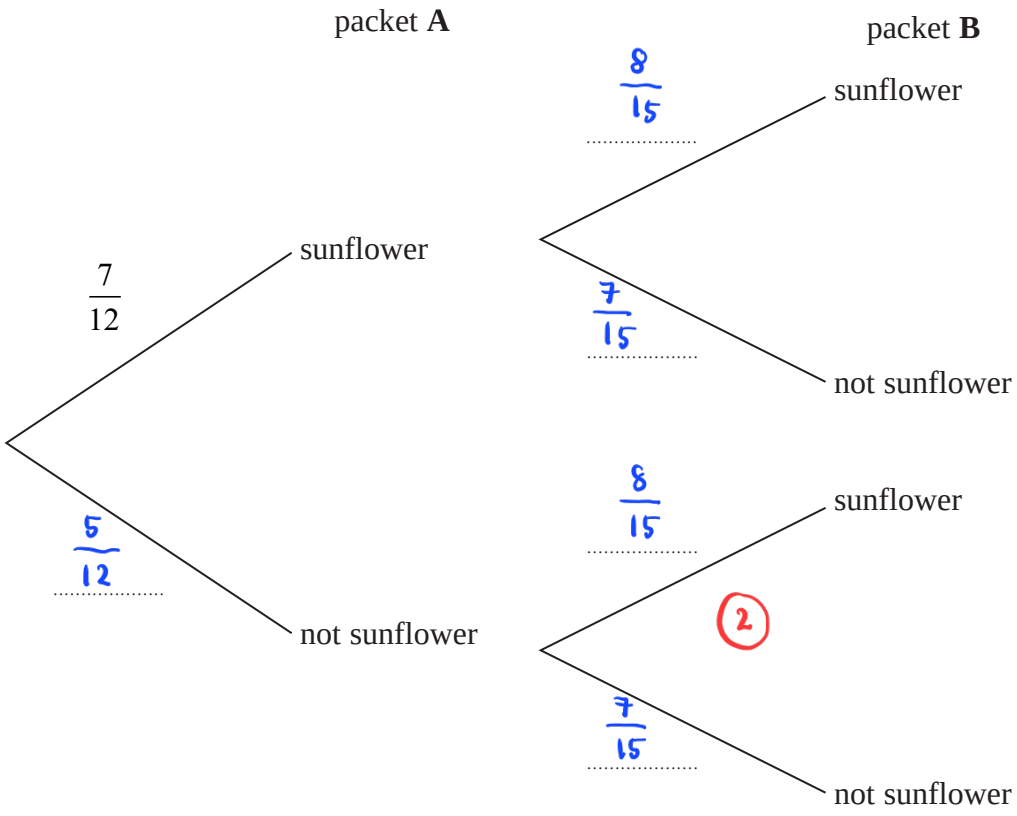
(Total for Question 8 is 7 marks)

9 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.



(2)

(Total for Question 9 is 2 marks)

10 Here are 9 cards. Each card has either a number on it or a letter on it.

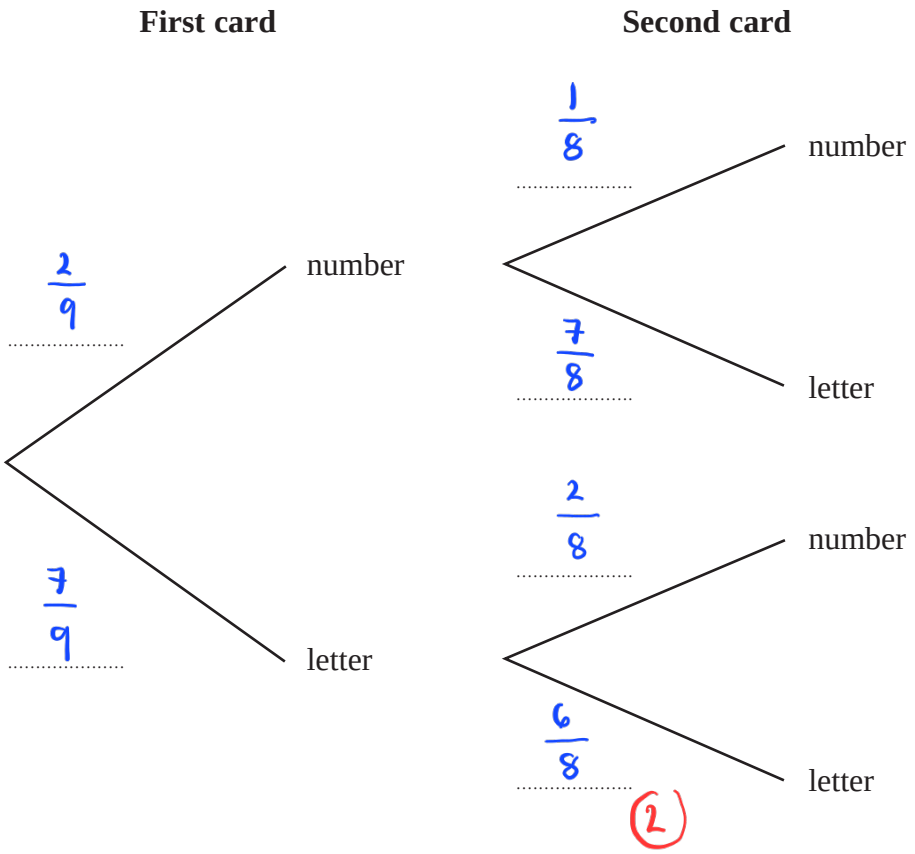
A	7	H	F	E	D	G	5	C

Tomas is playing a game.

Tomas takes at random one of the cards and keeps it.

Tomas then takes at random another card and keeps it.

(a) Complete the probability tree diagram.



(2)

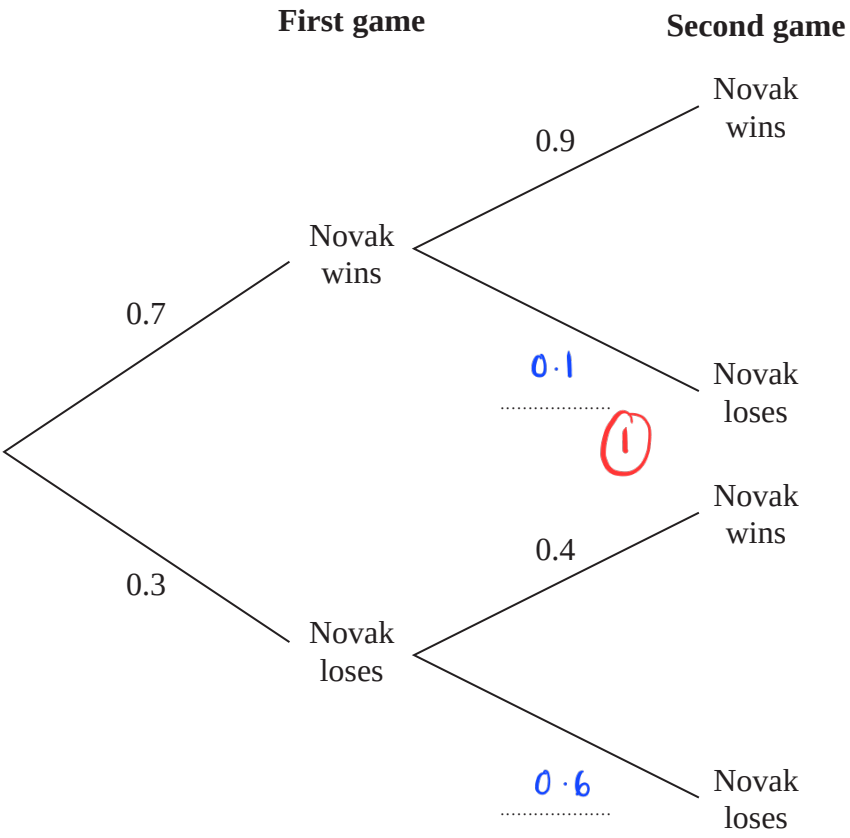
(Total for Question 10 is 2 marks)

11 Novak is going to play two games of tennis.

The probability that he wins the first game is 0.7

If he wins the first game, the probability that he wins the second game is 0.9
If he loses the first game, the probability that he wins the second game is 0.4

(a) Complete the probability tree diagram.



(1)

(b) Work out the probability that Novak wins both games of tennis.

$0.7 \times 0.9 = 0.63$

(1) (1)

0.63

(2)

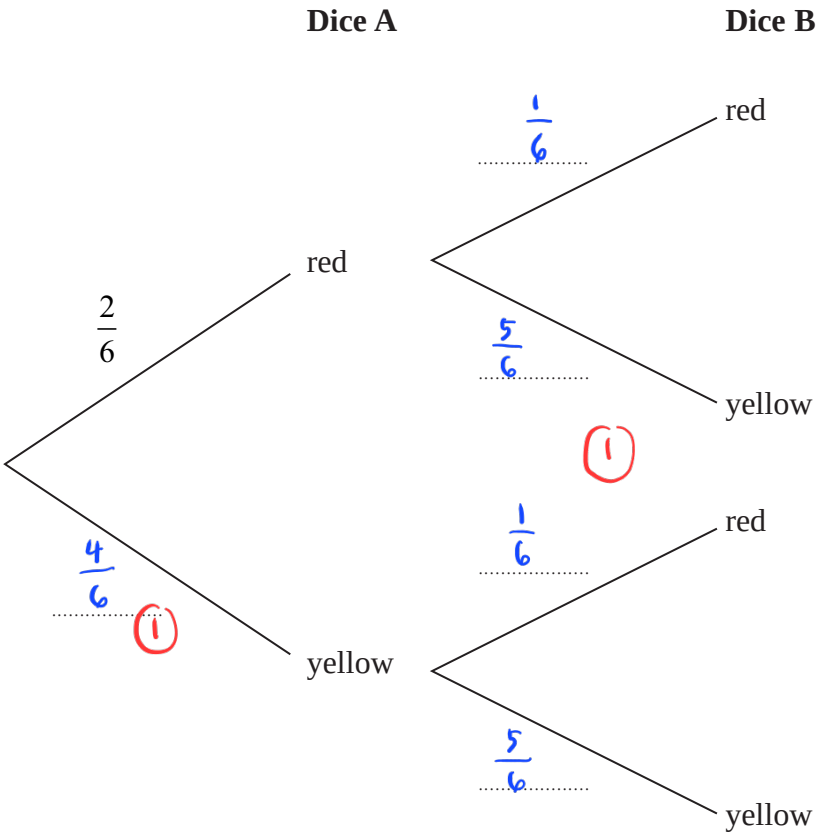
(Total for Question 11 is 3 marks)

12 Narin has two fair 6-sided dice.

Dice **A** has 2 red faces and 4 yellow faces.
Dice **B** has 1 red face and 5 yellow faces.

Narin is going to throw each dice once.

(a) Complete the probability tree diagram.



(2)

(Total for Question 12 is 2 marks)