

Exam Questions

Tree Diagrams

Probability Tree Diagrams

Medium (12 questions)	/50
Hard (10 questions)	/47
Very Hard (11 questions)	/62
Total Marks	/159

Scan here to return to the course
or visit [savemyexams.com](https://www.savemyexams.com)

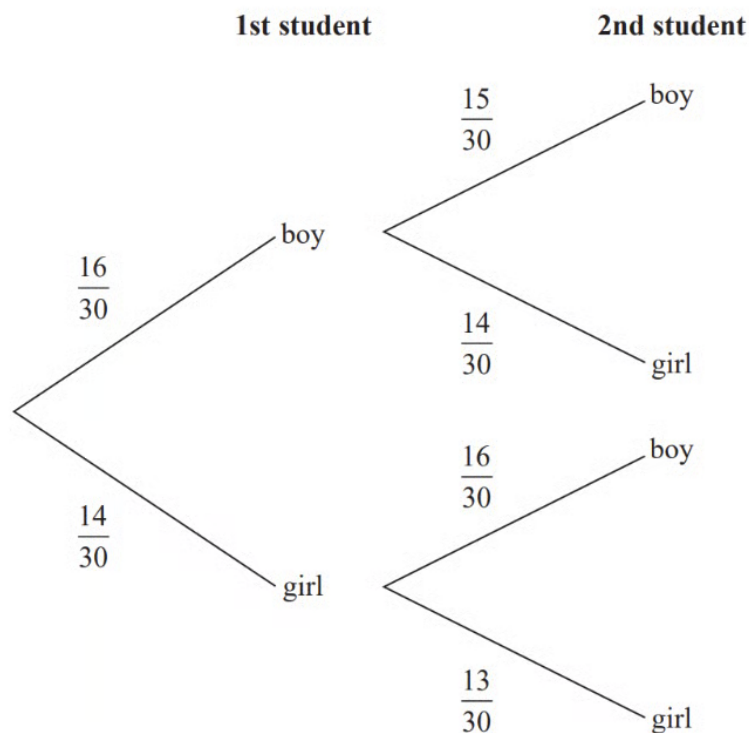


Medium Questions

- 1 (a) There are 30 students in Mr Lear's class.
16 of the students are boys.

Two students from the class are chosen at random.

Mr Lear draws this probability tree diagram for this information.



Write down **one** thing that is wrong with the probabilities in the probability tree diagram.

(1 mark)

- (b) Owen and Wasim play for the school football team.

The probability that Owen will score a goal in the next match is 0.4 The probability that Wasim will score a goal in the next match is 0.25

Mr Slater says,

"The probability that both boys will score a goal in the next match is $0.4 + 0.25$ "

Is Mr Slater right?

Give a reason for your answer.

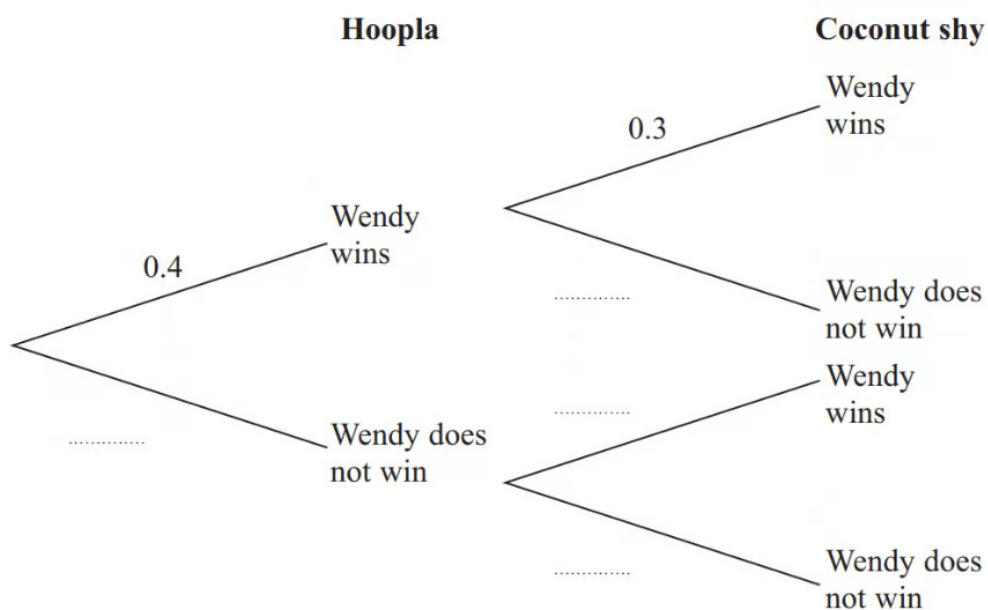
(1 mark)

- 2 (a)** 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

Complete the probability tree diagram.



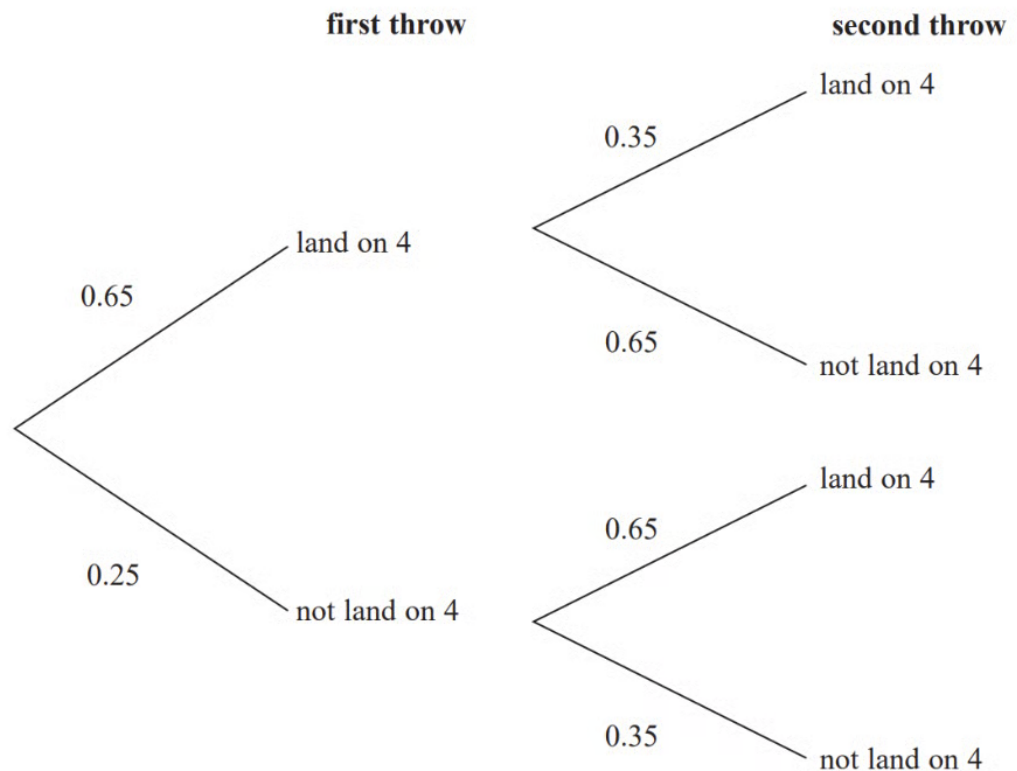
(2 marks)

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

(2 marks)

- 3** When a biased 6-sided dice is thrown once, the probability that it will land on 4 is 0.65
The biased dice is thrown twice.

Amir draws this probability tree diagram.
The diagram is **not** correct.



Write down **two** things that are wrong with the probability tree diagram.

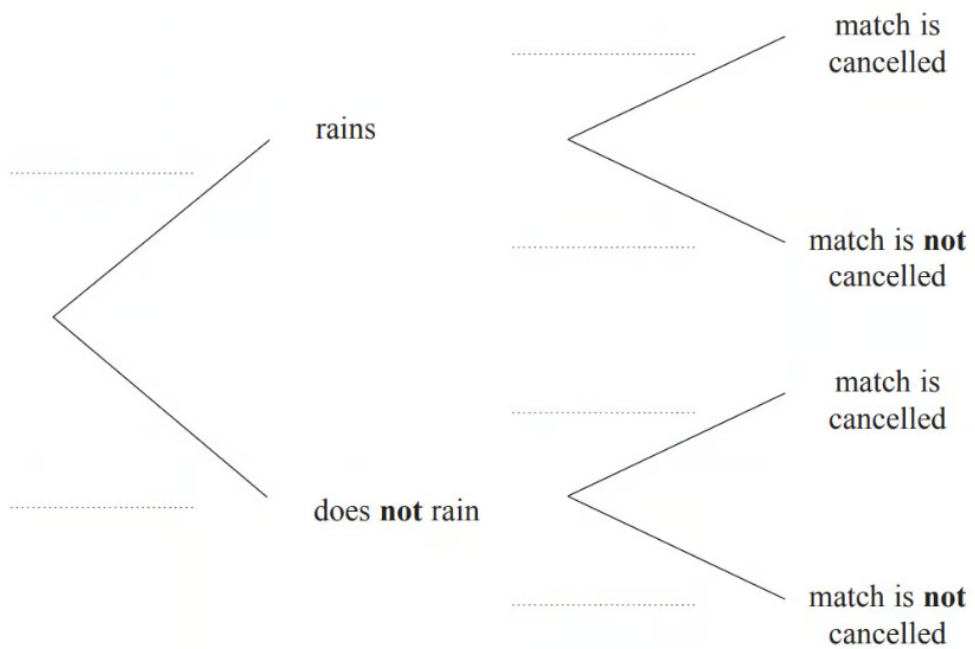
(2 marks)

4 (a) 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

Complete the probability tree diagram for this information.



(3 marks)

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

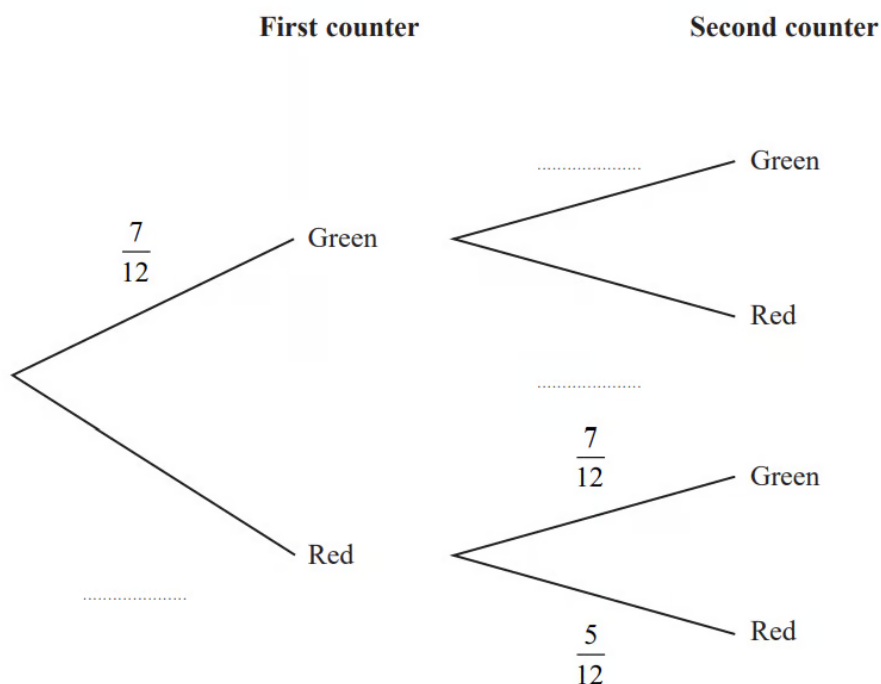
(2 marks)

- 5 (a)** 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.

Complete the probability tree diagram.



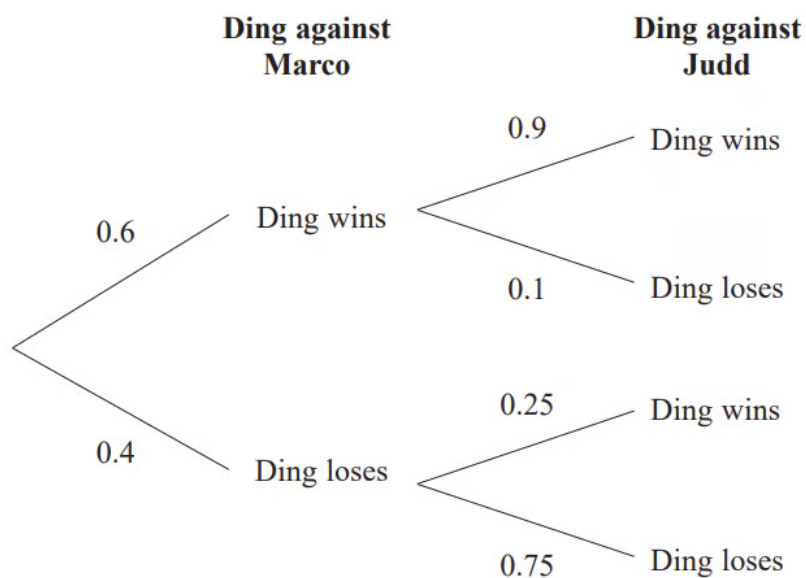
(2 marks)

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

(2 marks)

- 6 (a)** 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.



Work out the probability that Ding will win both games.

(2 marks)

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

(3 marks)

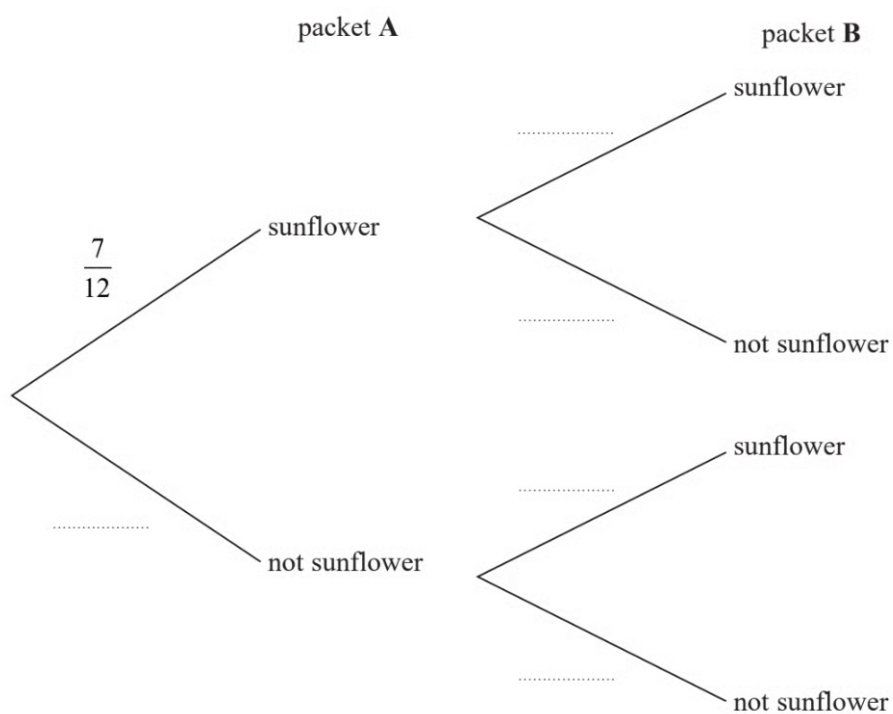
7 (a) Aika has 2 packets of seeds, packet A and packet B.

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**.

Complete the probability tree diagram.

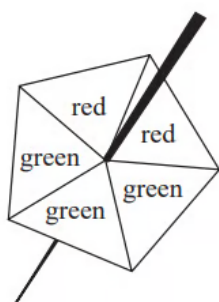


(2 marks)

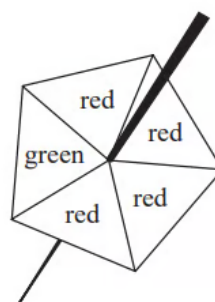
(b) Calculate the probability that Aika will take two sunflower seeds.

(2 marks)

8 (a) Harry has two fair 5-sided spinners.



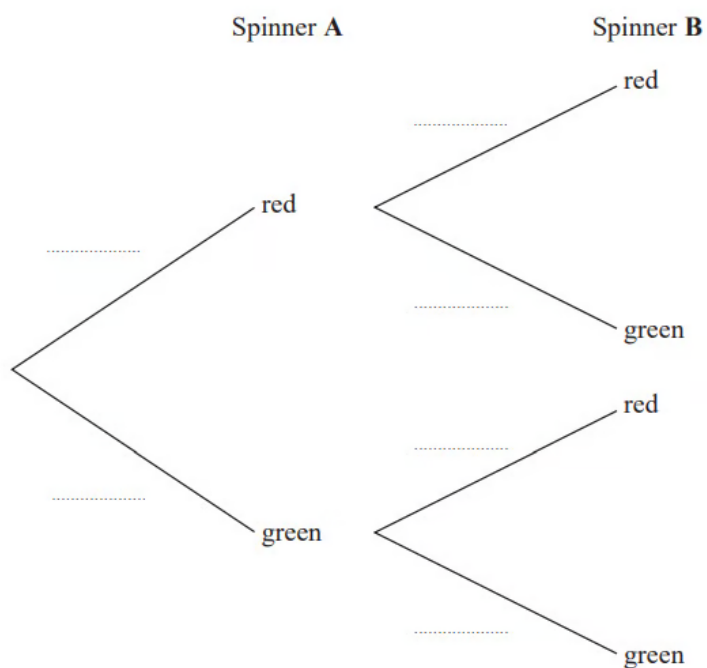
Spinner A



Spinner B

Harry is going to spin each spinner once.

Complete the probability tree diagram.



(2 marks)

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

(3 marks)

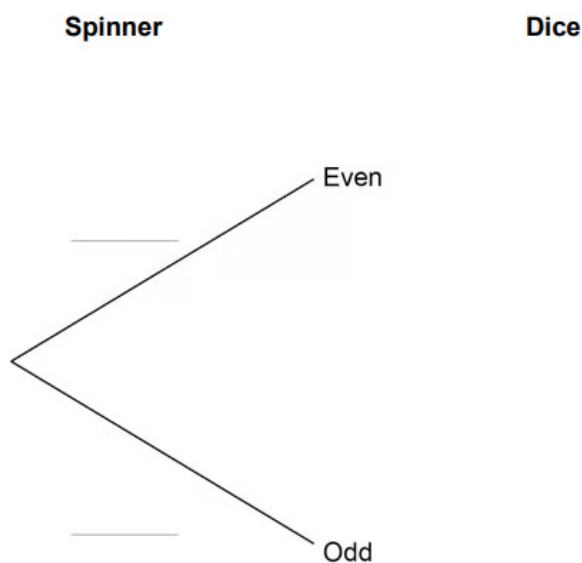
9 (a) A fair spinner has five equal sections numbered 1, 2, 3, 4 and 5

A fair six-sided dice has five red faces and one green face.

The spinner is spun.

If the spinner shows an even number, the dice is thrown.

Complete the tree diagram for the spinner and the dice.



(2 marks)

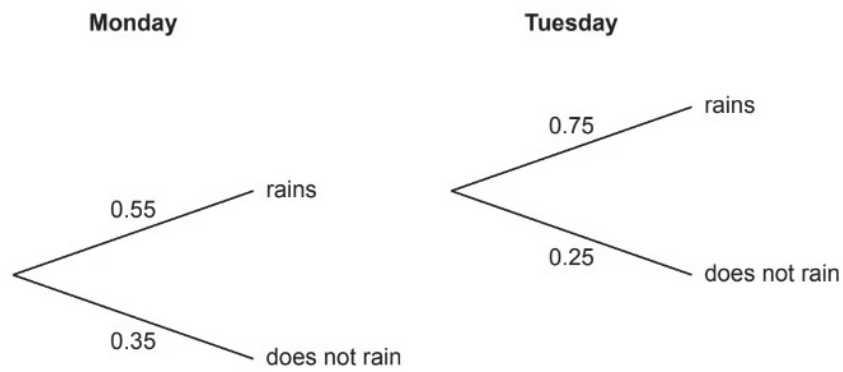
(b) Work out the probability of getting an even number and the colour green.

(2 marks)

10 A weather forecast says

- the probability that it will rain on Monday is 0.55 and
- the probability that it will rain on Tuesday is 0.25.

Ella draws a tree diagram to show this information.

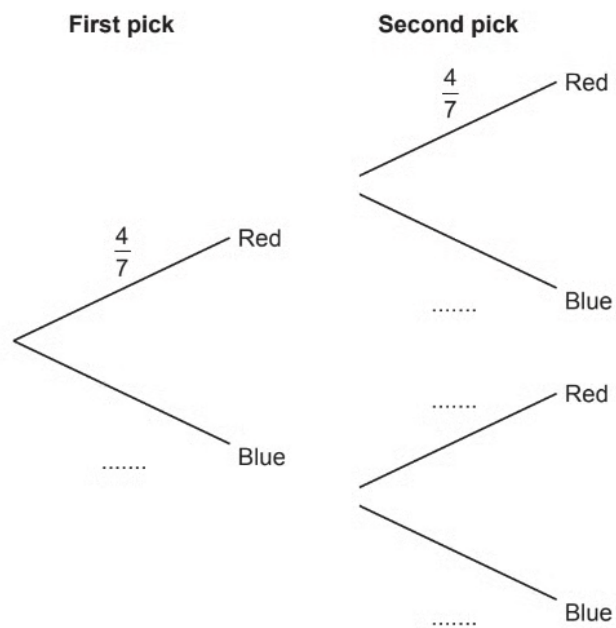


Write down three errors that Ella has made with her tree diagram.

(3 marks)

- 11 (a)** A bag contains 4 red counters and 3 blue counters only.
Jack picks a counter at random and then replaces it.
Jack then picks a second counter at random.

Complete the tree diagram.



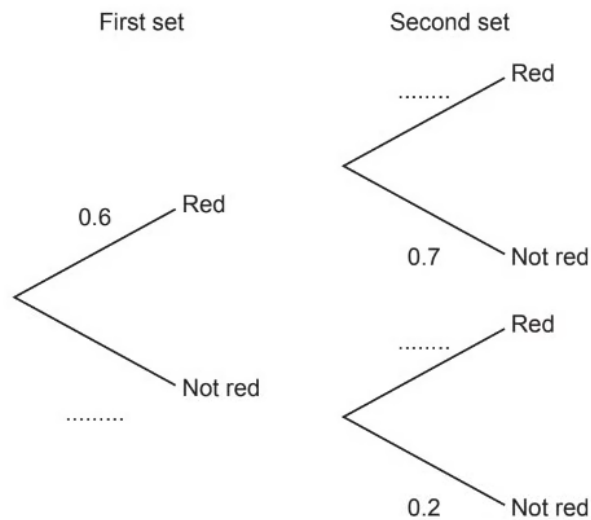
(2 marks)

(b) Work out the probability that Jack picks two red counters.

(2 marks)

12 (a) Rashid drives his car along a road passing through two sets of traffic lights.

The tree diagram shows the probabilities of the lights being red when he reaches them.



Complete the tree diagram.

(1 mark)

(b) Write down the probability that the first set is **not red**.

(1 mark)

(c) Given that the first set is **red**, write down the probability that the second set is **not red**.

(1 mark)

(d) Work out the probability that both sets are **not red**.

(2 marks)

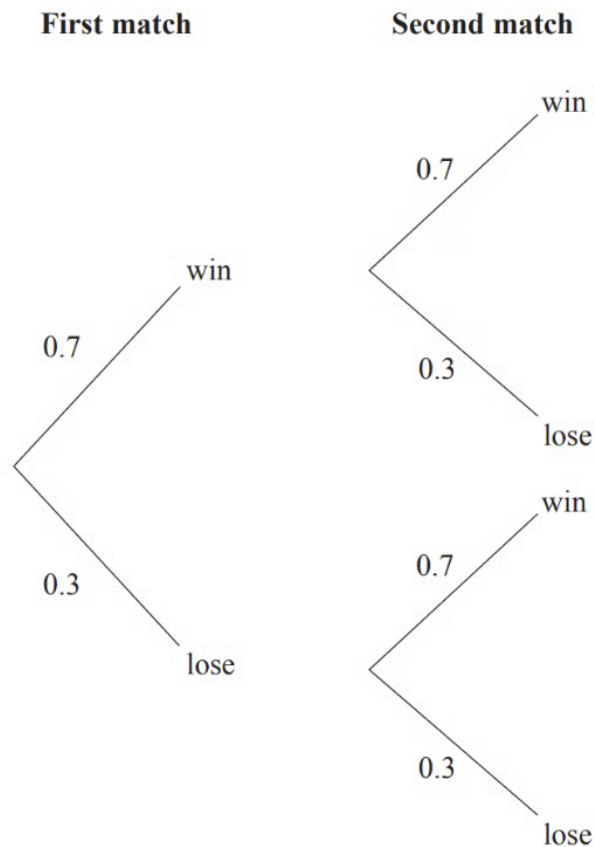
(e) Work out the probability that at least one set is **not red**.

(3 marks)

Hard Questions

1 (a) Finlay plays two tennis matches.

The probability that he will win a match and the probability that he will lose a match are shown in the probability tree diagram.



Work out the probability that Finlay wins both matches.

(2 marks)

(b) Work out the probability that Finlay loses at least one match.

(2 marks)

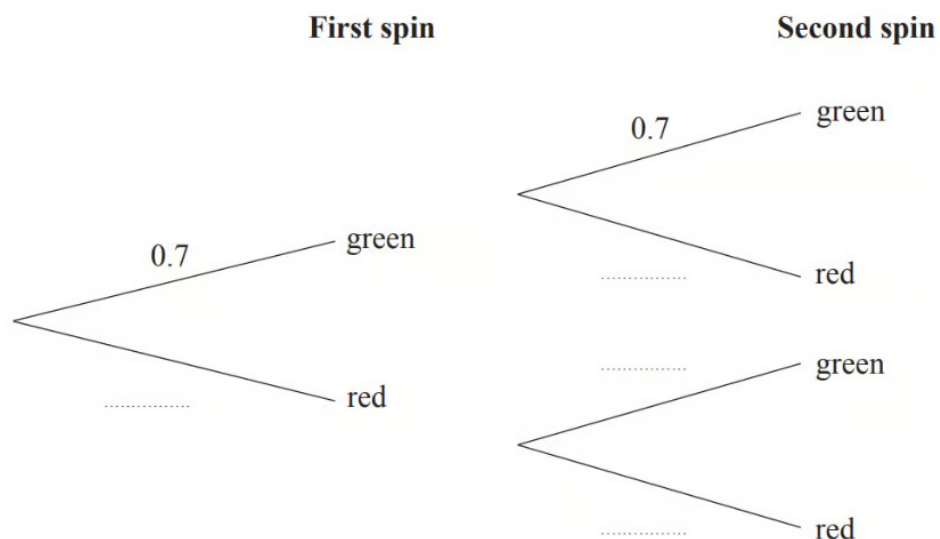
2 (a) Louise makes a spinner.

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.

Complete the probability tree diagram.



(2 marks)

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

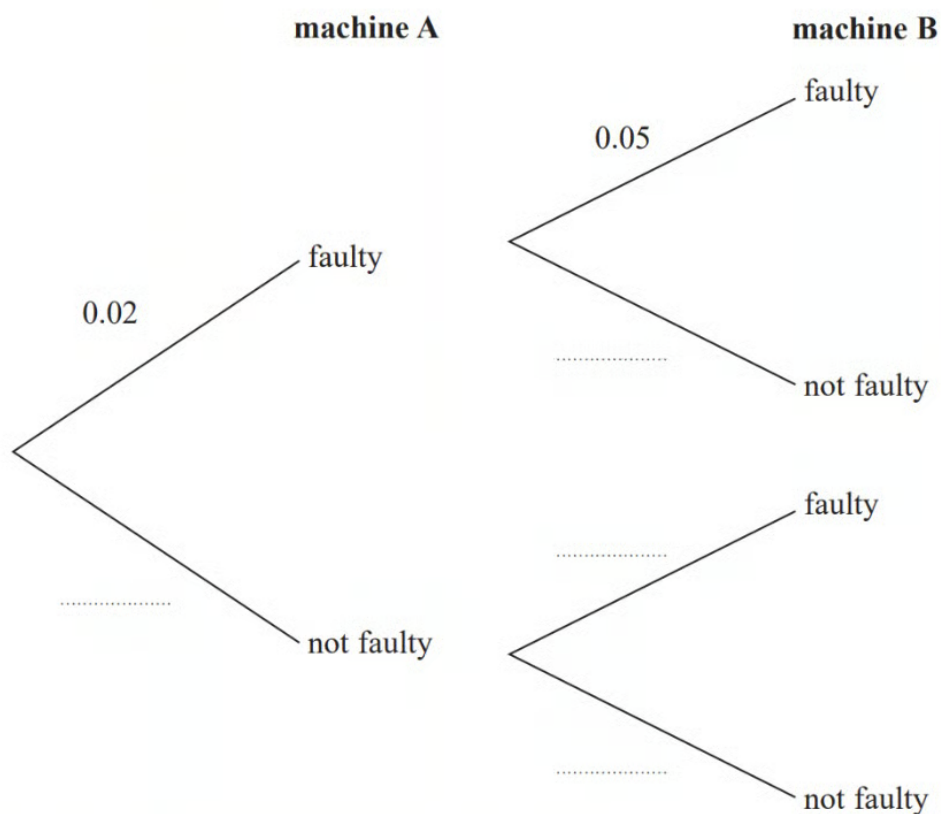
(3 marks)

3 (a) Machine A and machine B make bottles.

The probability that a bottle made by machine A is faulty is 0.02

The probability that a bottle made by machine B is faulty is 0.05

Complete the probability tree diagram.



(2 marks)

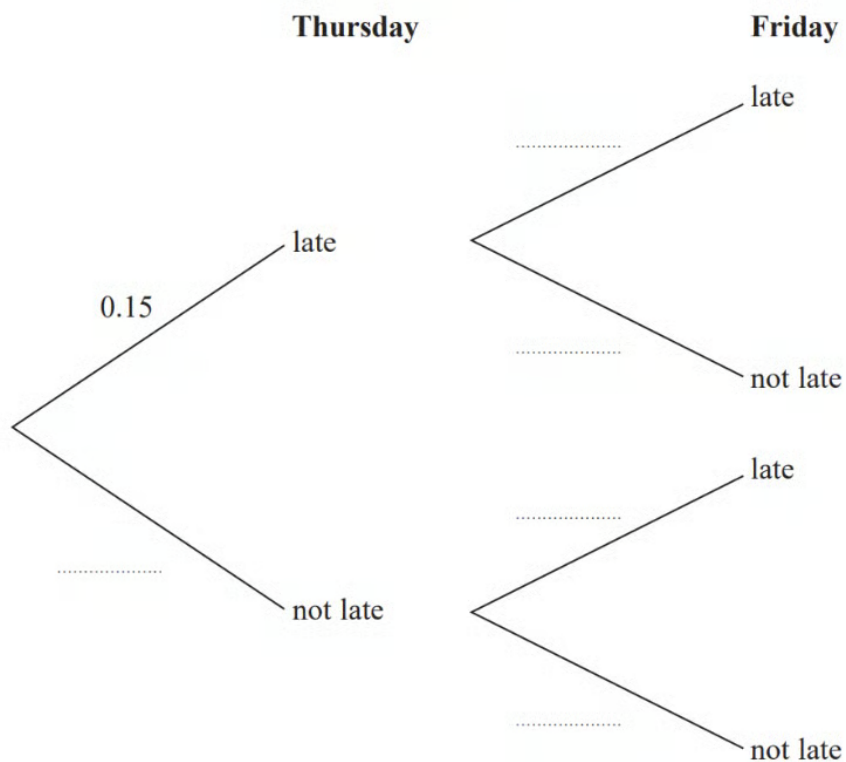
(b) Shazia takes at random one bottle made by machine A and one bottle made by machine B.

Work out the probability that at least one of these bottles is faulty.

(3 marks)

- 4 (a)** Mary travels to work by train every day.
The probability that her train will be late on any day is 0.15

Complete the probability tree diagram for Thursday and Friday.



(2 marks)

- (b)** Work out the probability that her train will be late on at least one of these two days.

(3 marks)

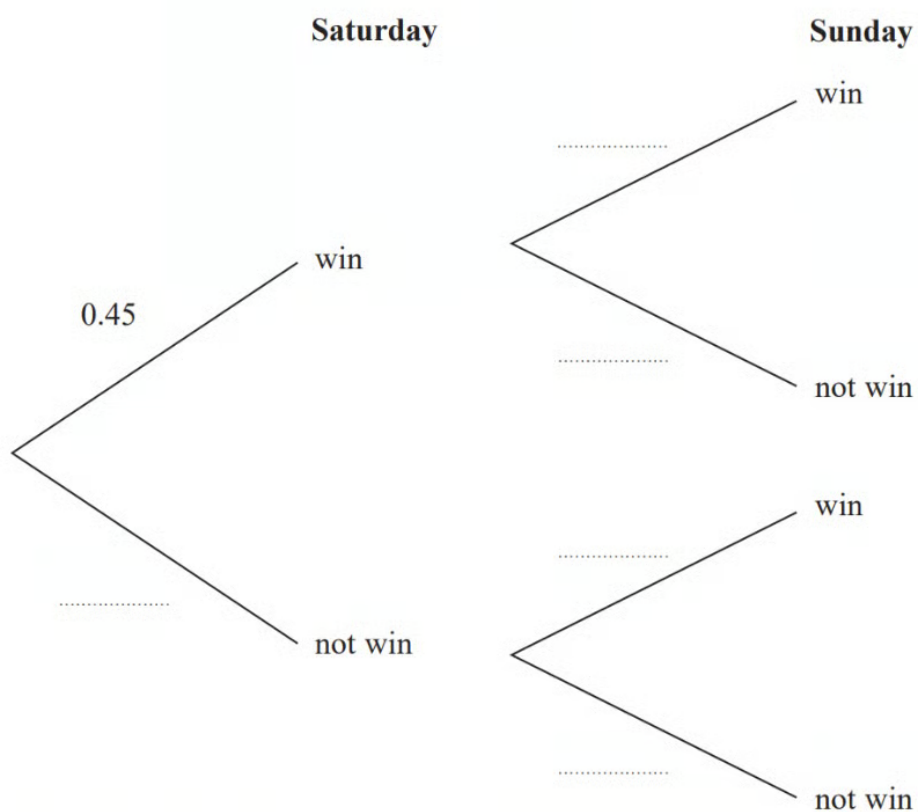
5 (a) A darts team is going to play a match on Saturday and on Sunday.

The probability that the team will win on Saturday is 0.45

If they win on Saturday, the probability that they will win on Sunday is 0.67

If they do **not** win on Saturday, the probability that they will win on Sunday is 0.35

Complete the probability tree diagram.



(2 marks)

(b) Find the probability that the team will win exactly one of the two matches.

(3 marks)

6 (a) Yvonne has 10 tulip bulbs in a bag.

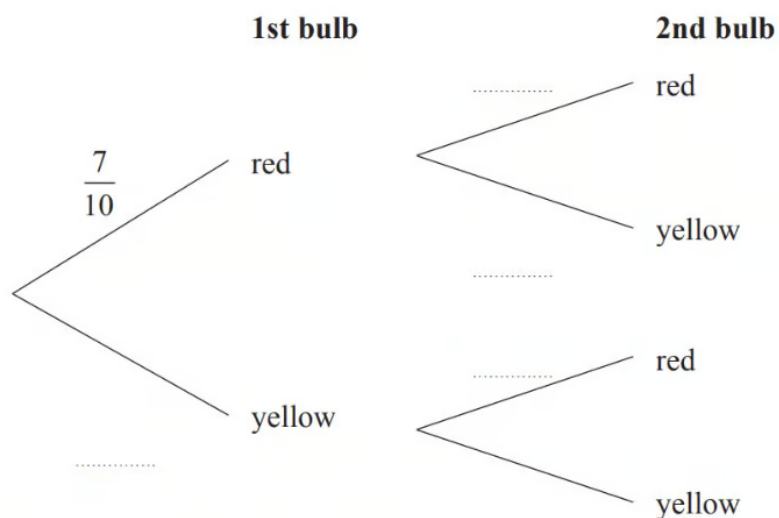
7 of the tulip bulbs will grow into red tulips.

3 of the tulip bulbs will grow into yellow tulips.

Yvonne takes at random two tulip bulbs from the bag.

She plants the bulbs.

Complete the probability tree diagram.



(2 marks)

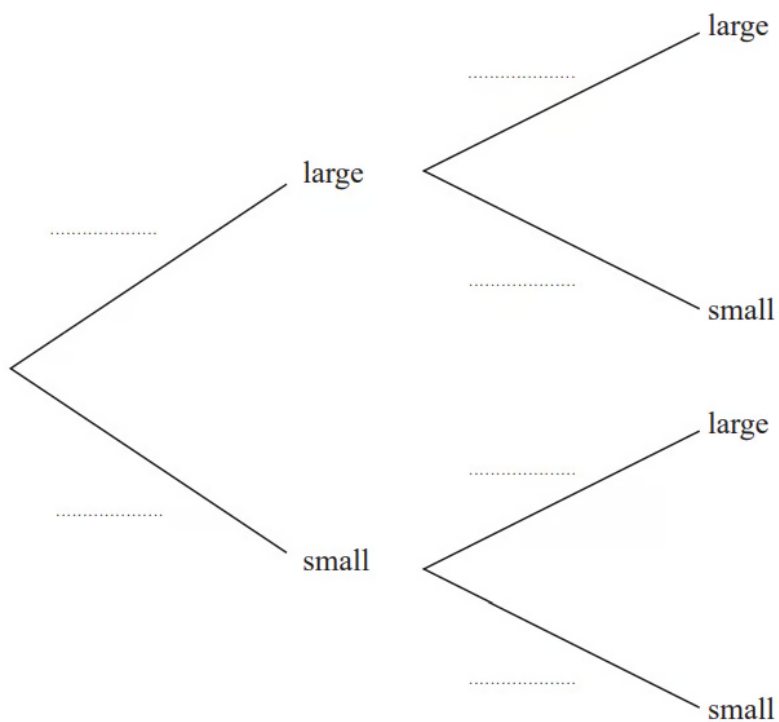
(b) Work out the probability that at least one of the bulbs will grow into a yellow tulip.

(3 marks)

- 7 (a)** 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.

Complete the probability tree diagram.



(2 marks)

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

(2 marks)

8 (a) Items made at a factory have to pass two checks.

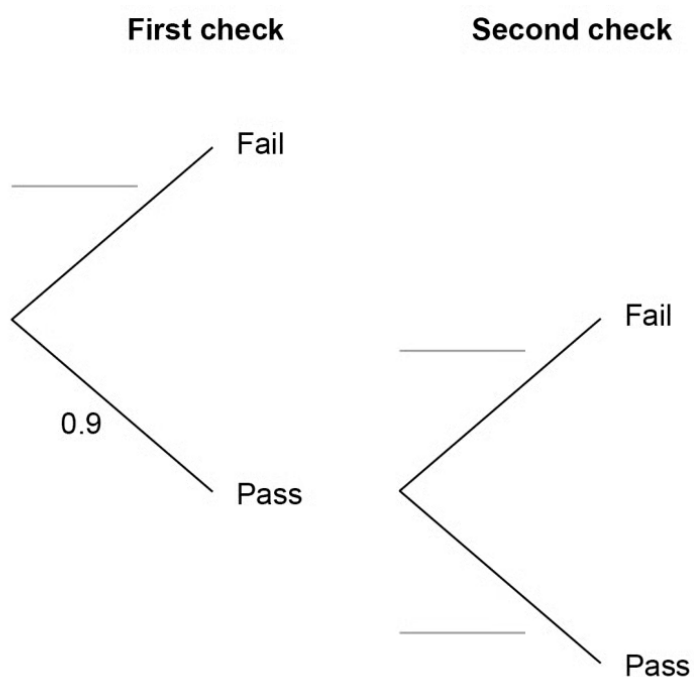
90% pass the first check.

The items that fail are scrapped.

99% of the items that pass the first check pass the second check.

The items that fail are scrapped.

Complete the tree diagram.



(2 marks)

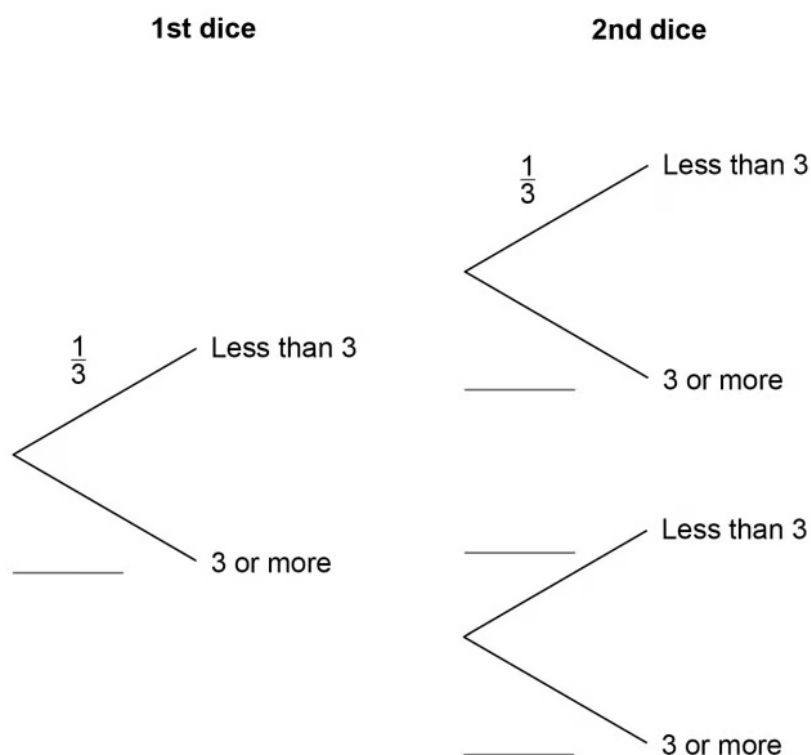
(b) An item is chosen at random before the checks.

Work out the probability that the item is scrapped.

(3 marks)

9 (a) Two ordinary fair dice are rolled.

Complete the tree diagram.



(1 mark)

(b) Work out the probability that **both** dice land on a number less than 3.

(1 mark)

(c) Work out the probability that **exactly one** of the dice lands on a number less than 3.

(2 marks)

10 The probability that any postcard posted in Portugal on Monday is delivered to the UK within a week is 0.62.

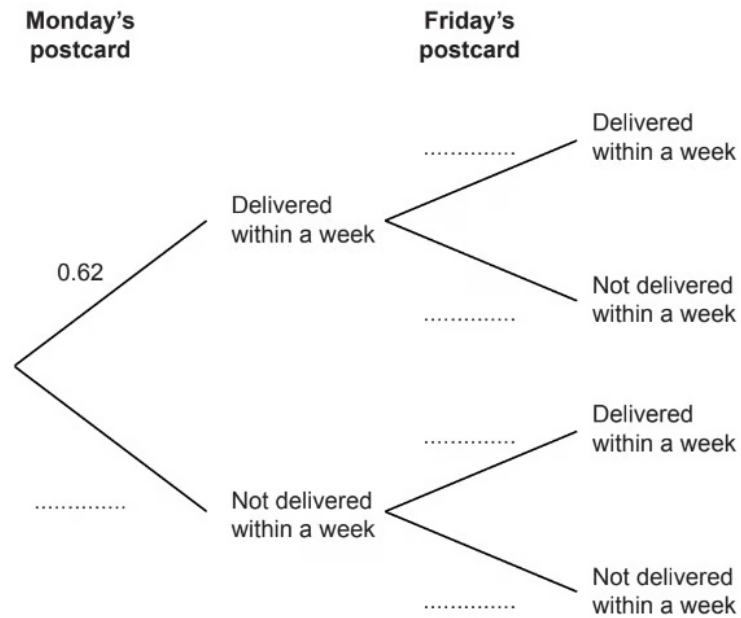
The probability that any postcard posted in Portugal on Friday is delivered to the UK within a week is 0.41.

Sergio is in Portugal.

He posts one postcard to the UK on Monday.

He posts another postcard to the UK on Friday.

i) Complete the probability tree to show the possible outcomes for the postcards.



[2]

ii) Calculate the probability that only one of Sergio's postcards is delivered within a week.

[3]

(5 marks)

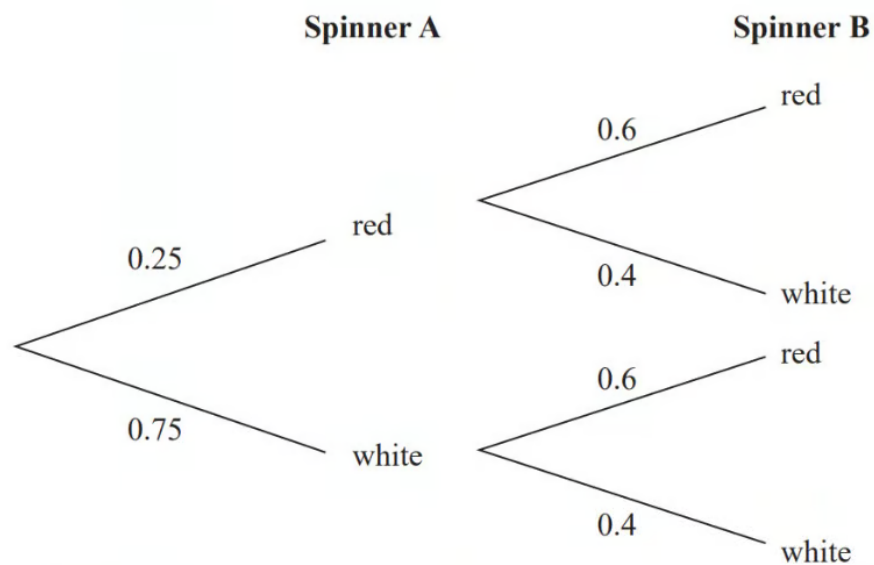
Very Hard Questions

- 1 Alan has two spinners, spinner **A** and spinner **B**.
Each spinner can land on only red or white.

The probability that spinner **A** will land on red is 0.25

The probability that spinner **B** will land on red is 0.6

The probability tree diagram shows this information.



Alan spins spinner **A** once and he spins spinner **B** once.
He does this a number of times.

The number of times **both** spinners land on red is 24.

Work out an estimate for the number of times **both** spinners land on white.

(3 marks)

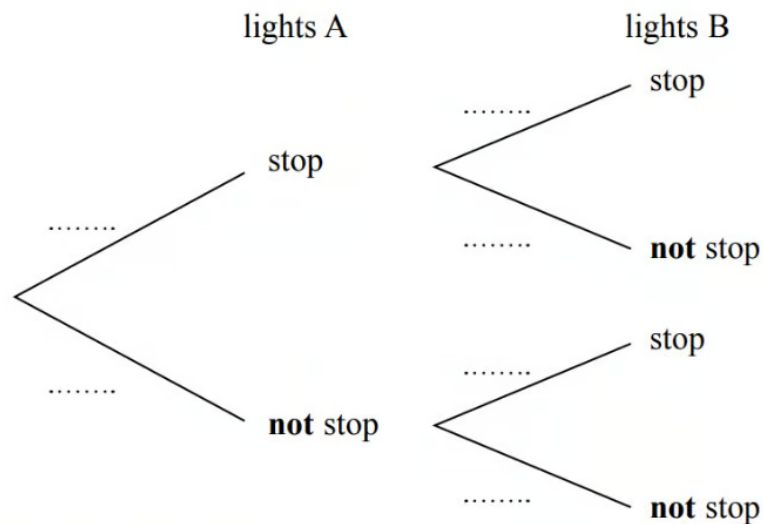
- 2 (a) A and B are two sets of traffic lights on a road.

The probability that a car is stopped by lights A is 0.4

If a car is stopped by lights A, then the probability that the car is **not** stopped by lights B is 0.7

If a car is **not** stopped by lights A, then the probability that the car is **not** stopped by lights B is 0.2

Complete the probability tree diagram for this information.



(2 marks)

- (b) Mark drove along this road.
He was stopped by just one of the sets of traffic lights.

Is it more likely that he was stopped by lights A or by lights B?
You must show your working.

(3 marks)

3 (a) Cody has two bags of counters, bag **A** and bag **B**.

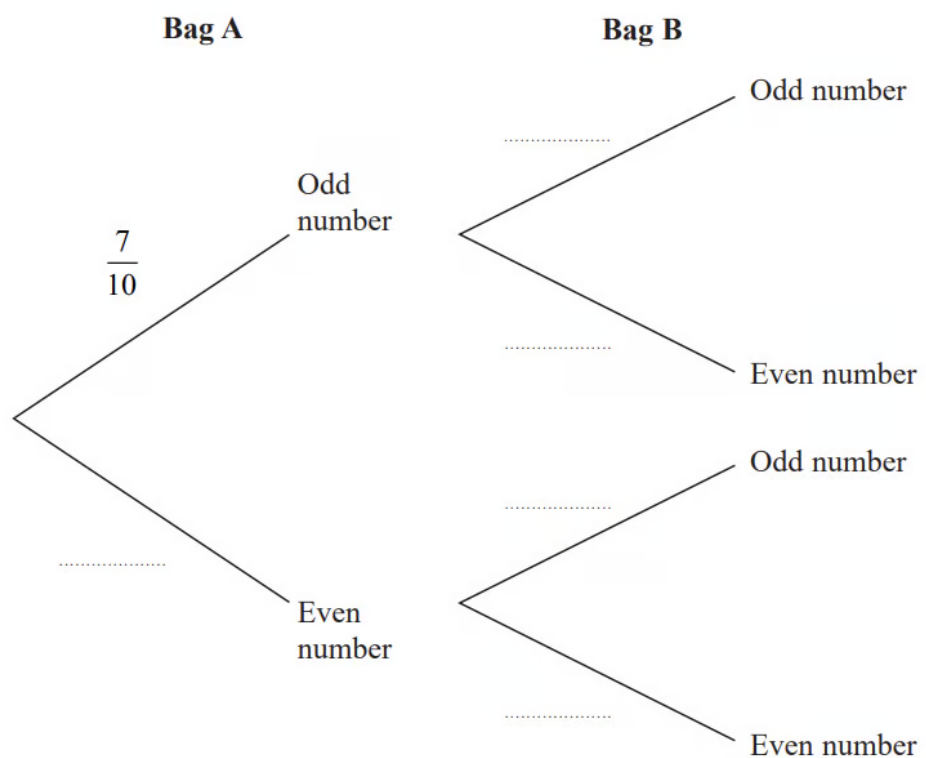
Each of the counters has either an odd number or an even number written on it.

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**.

Complete the probability tree diagram.



(2 marks)

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

(3 marks)

(c) 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 $\frac{3}{100}$

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

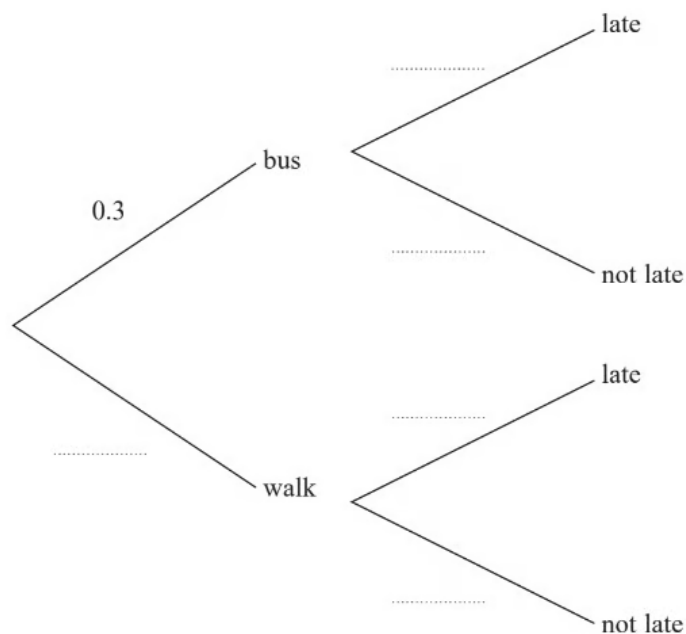
(3 marks)

- 4 (a)** 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

Complete the probability tree diagram.



(2 marks)

- (b)** Barney will go to college on 200 days next year.

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

(4 marks)

5 (a) Felix has 10 cards.

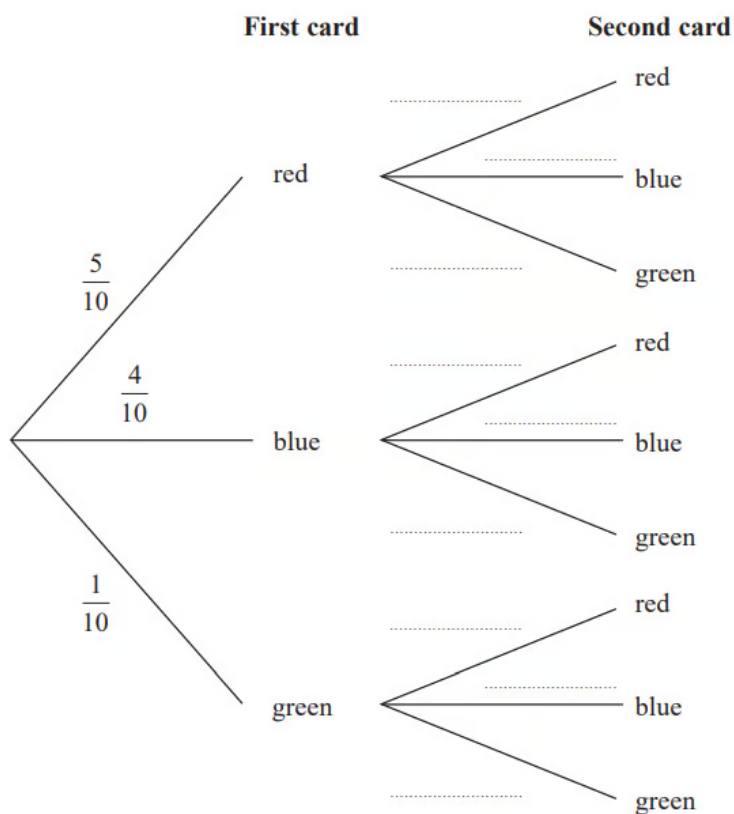
There are 5 red cards, 4 blue cards and 1 green card.

Felix takes at random one of the cards.

He does not replace the card.

Felix then takes at random a second card.

Complete the probability tree diagram.



(2 marks)

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

(3 marks)

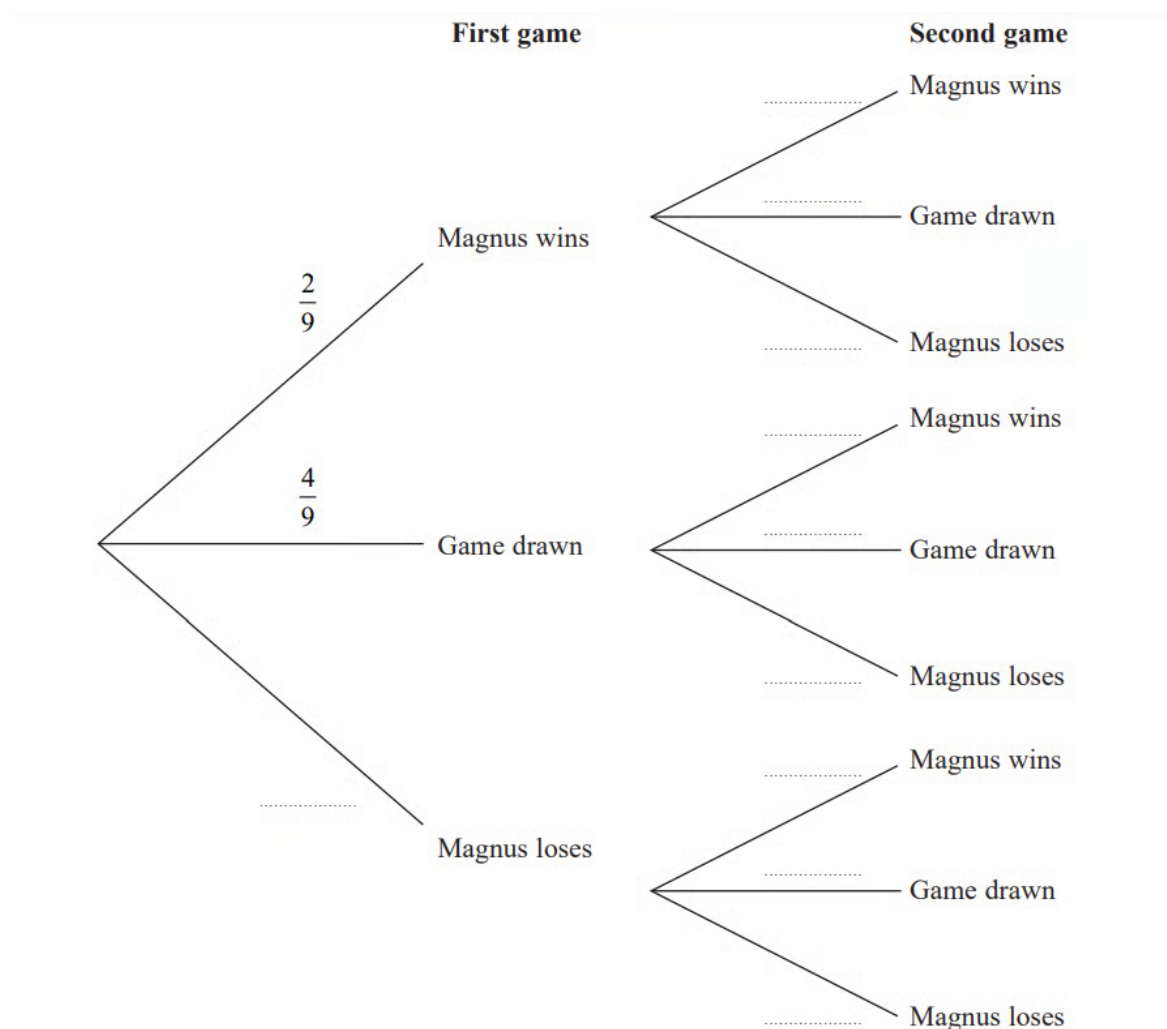
6 (a) Magnus and Garry play 2 games of chess against each other.

The probability that Magnus beats Garry in any game is $\frac{2}{9}$

The probability that any game between Magnus and Garry is drawn is $\frac{4}{9}$

The result of any game is independent of the result of any other game.

Complete the probability tree diagram.



(2 marks)

(b) For each game of chess,

the winner gets 2 points and the loser gets 0 points,

when the game is drawn, each player gets 1 point.

Work out the probability that, after 2 games, Magnus and Garry have the same number of points.

(3 marks)

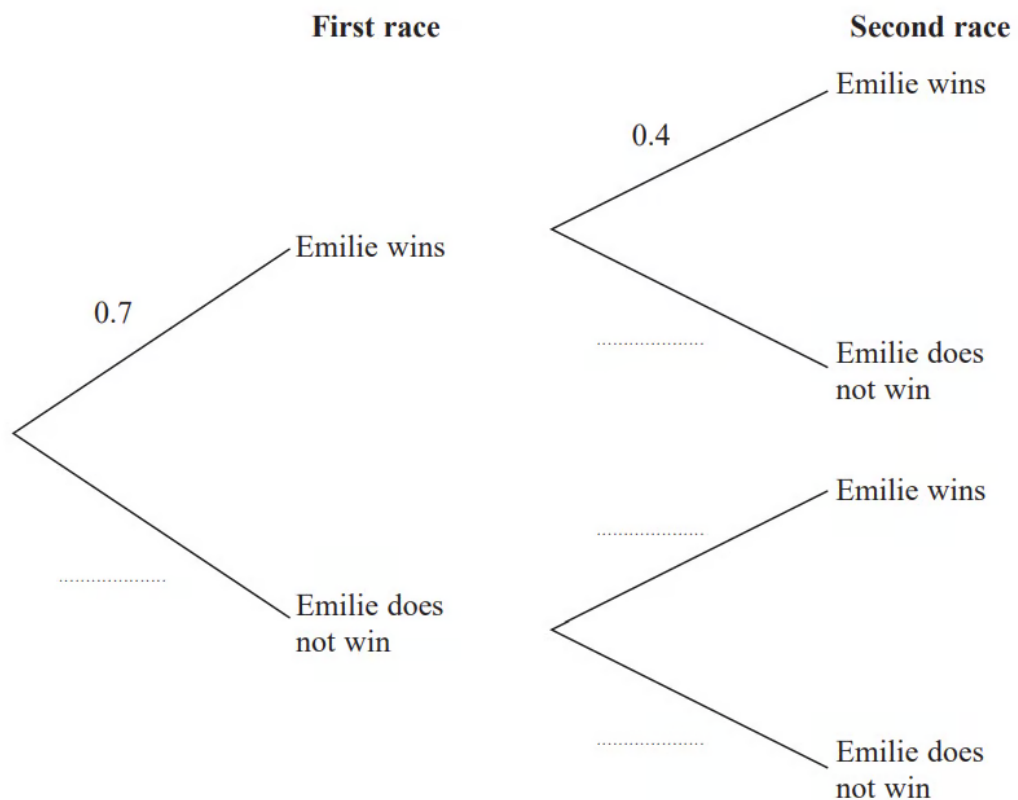
7 (a) Emilie takes part in two races.

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.

Complete the probability tree diagram.



(2 marks)

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

(3 marks)

(c) 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

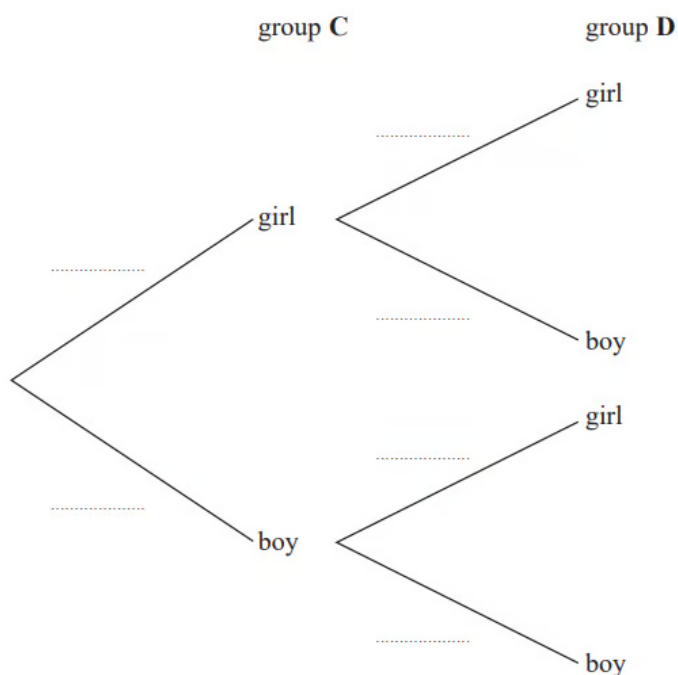
Work out the probability that Emilie will win exactly two of the three races.

(3 marks)

- 8 (a)** 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**.

Complete the probability tree diagram.



(2 marks)

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

(2 marks)

- (c)** 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**.

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

(3 marks)

9 (a) Anna plays a game with an ordinary, fair dice.

If she rolls 1 she wins.

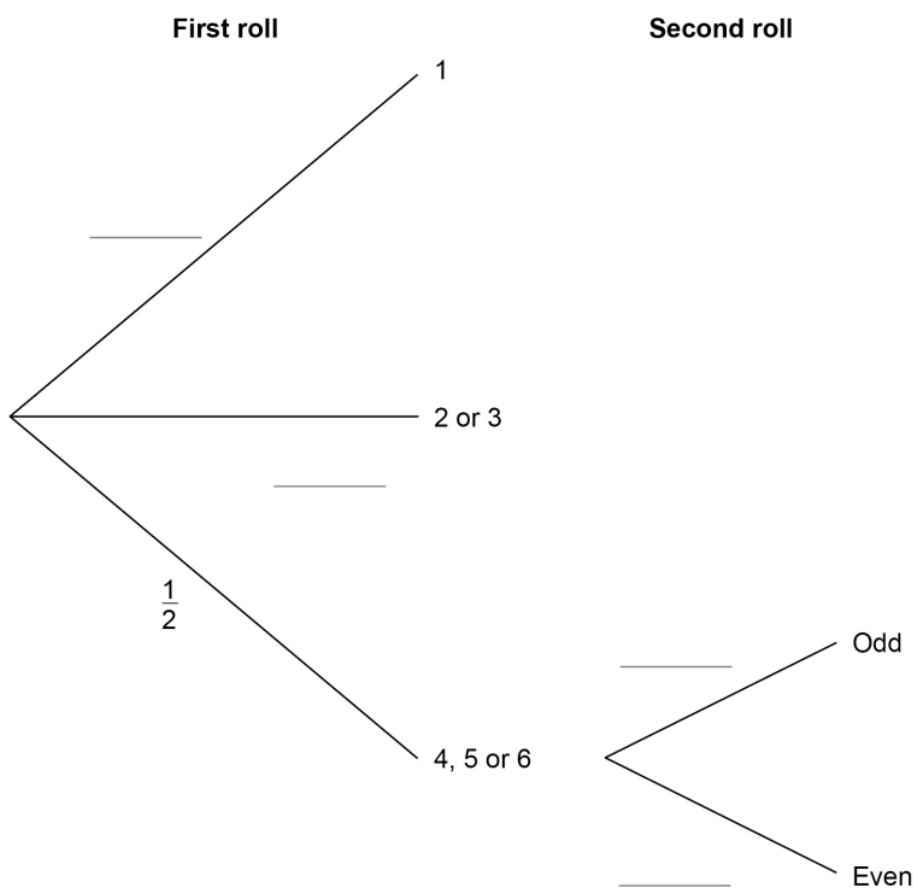
If she rolls 2 or 3 she loses.

If she rolls 4, 5 or 6 she rolls again.

When she has to roll again,

- if she rolls an odd number she wins
- if she rolls an even number she loses.

Complete the tree diagram with the four missing probabilities.



(2 marks)

(b) Is Anna more likely to win or to lose?

You **must** work out the probability that she wins.

(4 marks)

10 (a) On Friday, Greg takes part in a long jump competition. He has to jump at least 7.5 metres to qualify for the final on Saturday.

- He has up to three jumps to qualify.
- If he jumps at least 7.5 metres he does **not** jump again on Friday.

Each time Greg jumps, the probability he jumps at least 7.5 metres is 0.8. Assume each jump is independent. Complete the tree diagram.

First jump	Second jump	Third jump
------------	-------------	------------

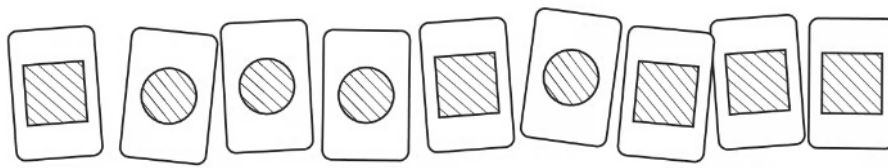


(2 marks)

(b) Work out the probability that he does **not** need the third jump to qualify.

(2 marks)

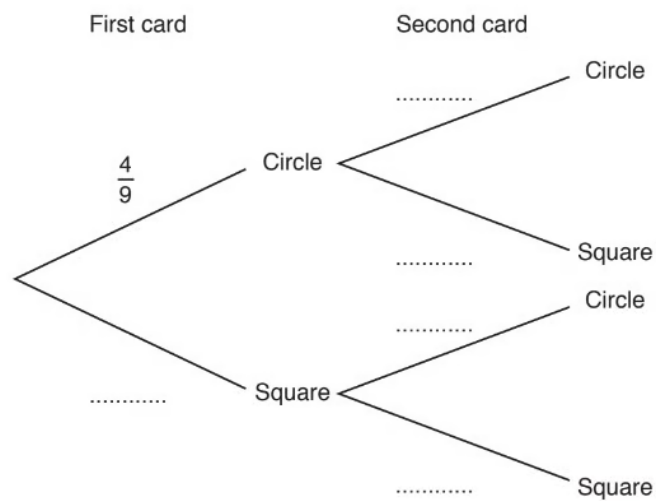
11 (a) Reuben is playing a matching game with these cards.



He turns the cards over and shuffles them.

Reuben takes a card and keeps it. He then takes a second card. If the cards are different, he wins the game.

Complete this tree diagram to show the probabilities for each card picked in the game.



(2 marks)

(b) What is the probability that Reuben wins the game?

(3 marks)