

1 There are only blue cubes, yellow cubes and green cubes in a bag.

There are

twice as many blue cubes as yellow cubes
and four times as many green cubes as blue cubes.

Hannah takes at random a cube from the bag.

Work out the probability that Hannah takes a yellow cube.

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(Total for Question 1 is 3 marks)

- 2 There are 12 counters in a bag.
There is an equal number of red counters, blue counters and yellow counters in the bag.
There are no other counters in the bag.

3 counters are taken at random from the bag.

- (a) Work out the probability of taking 3 red counters.

.....
(2)

The 3 counters are put back into the bag.

Some more counters are now put into the bag.
There is still an equal number of red counters, blue counters and yellow counters in the bag.
There are no counters of any other colour in the bag.

3 counters are taken at random from the bag.

- (b) Is it now less likely or equally likely or more likely that the 3 counters will be red?
You must show how you get your answer.

(2)

(Total for Question 2 is 4 marks)

3 When a drawing pin is dropped it can land point down or point up.

Lucy, Mel and Tom each dropped the drawing pin a number of times.

The table shows the number of times the drawing pin landed point down and the number of times the drawing pin landed point up for each person.

	Lucy	Mel	Tom
point down	31	53	16
point up	14	27	9

Rachael is going to drop the drawing pin once.

- (a) Whose results will give the best estimate for the probability that the drawing pin will land point up?
Give a reason for your answer.

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.....
(1)

Stuart is going to drop the drawing pin twice.

- (b) Use all the results in the table to work out an estimate for the probability that the drawing pin will land point up the first time and point down the second time.

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(2)

(Total for Question 3 is 3 marks)

- 4 There are only blue counters, yellow counters, green counters and red counters in a bag.
A counter is taken at random from the bag.

The table shows the probabilities of getting a blue counter or a yellow counter or a green counter.

Colour	blue	yellow	green	red
Probability	0.2	0.35	0.4	

- (a) Work out the probability of getting a red counter.

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(1)

- (b) What is the least possible number of counters in the bag?
You must give a reason for your answer.

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(2)

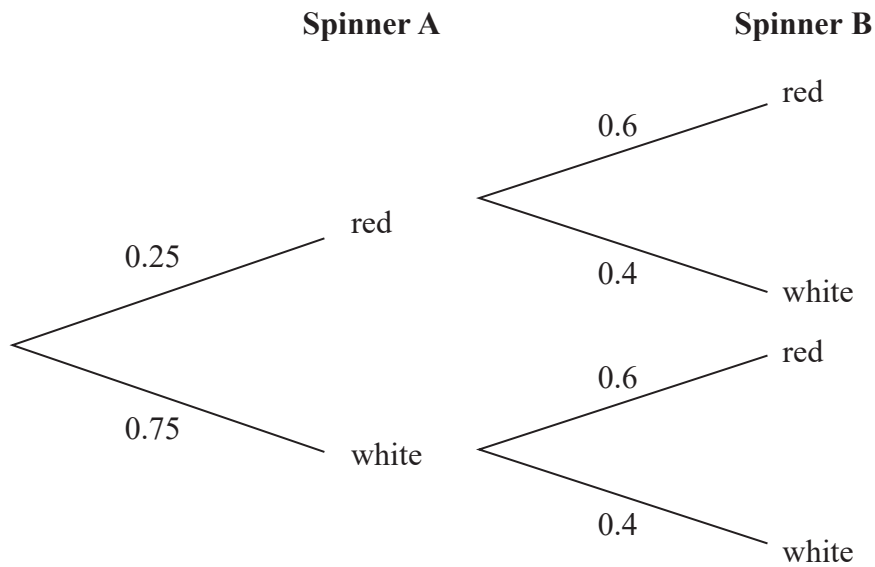
(Total for Question 4 is 3 marks)

- 5 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.

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(Total for Question 5 is 3 marks)

6 There are 9 counters in a bag.

7 of the counters are green.

2 of the counters are blue.

Ria takes at random two counters from the bag.

Work out the probability that Ria takes one counter of each colour.

You must show your working.

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(Total for Question 6 is 4 marks)

- 7 The table shows the probabilities that a biased dice will land on 2, on 3, on 4, on 5 and on 6

Number on dice	1	2	3	4	5	6
Probability		0.17	0.18	0.09	0.15	0.1

Neymar rolls the biased dice 200 times.

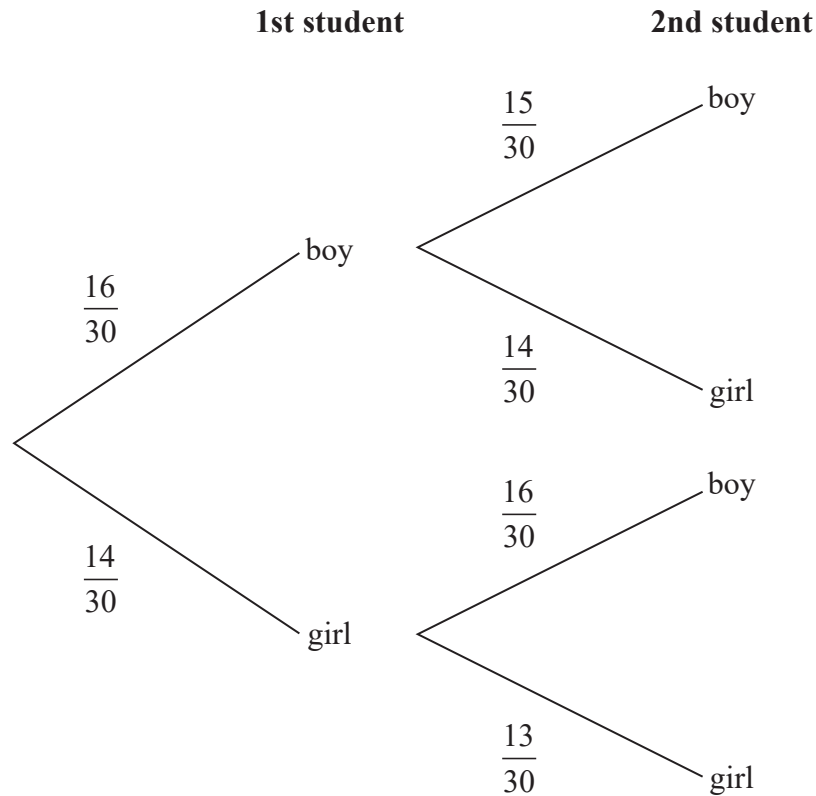
Work out an estimate for the total number of times the dice will land on 1 or on 3

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(Total for Question 7 is 3 marks)

- 8 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.



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

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.....

(1)

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 $0.4 + 0.25$ ”

- (b) Is Mr Slater right?

Give a reason for your answer.

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(1)

(Total for Question 8 is 2 marks)

- 9 There are only red counters, blue counters and purple counters in a bag.
The ratio of the number of red counters to the number of blue counters is 3 : 17
- Sam takes at random a counter from the bag.
The probability that the counter is purple is 0.2
- Work out the probability that Sam takes a red counter.

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(Total for Question 9 is 3 marks)

10 60 people were asked if they prefer to go on holiday in Britain or in Spain or in Italy.

38 of the people were male.

11 of the 32 people who said Britain were female.

8 males said Italy.

12 people said Spain.

One of the females is chosen at random.

What is the probability that this female said Spain?

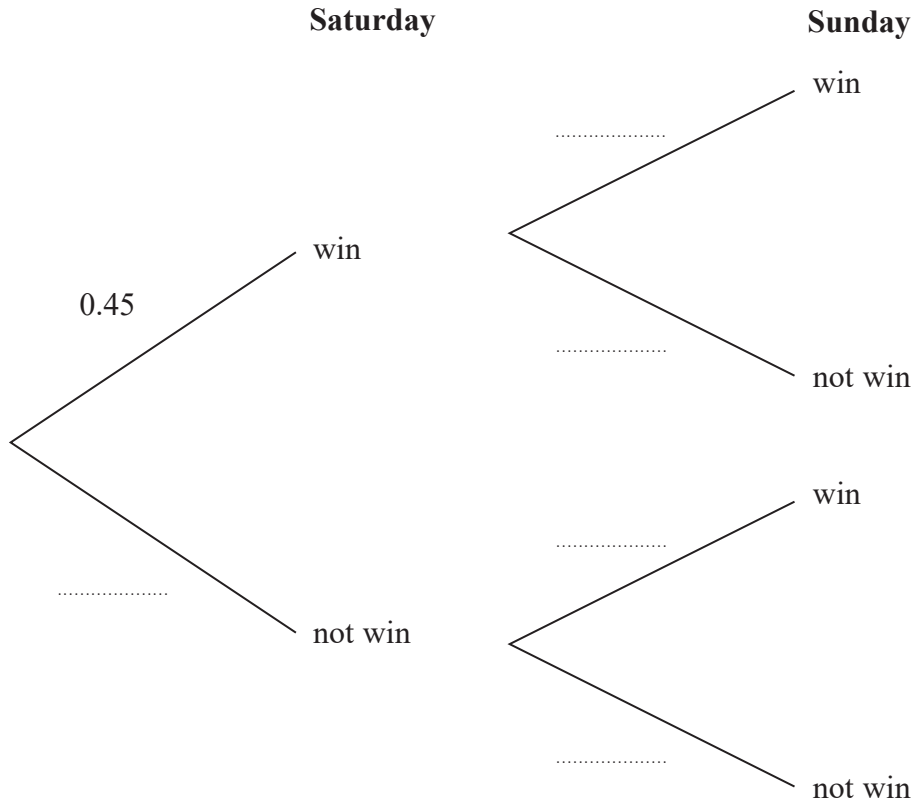
.....
(Total for Question 10 is 4 marks)

11 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

(a) Complete the probability tree diagram.



(2)

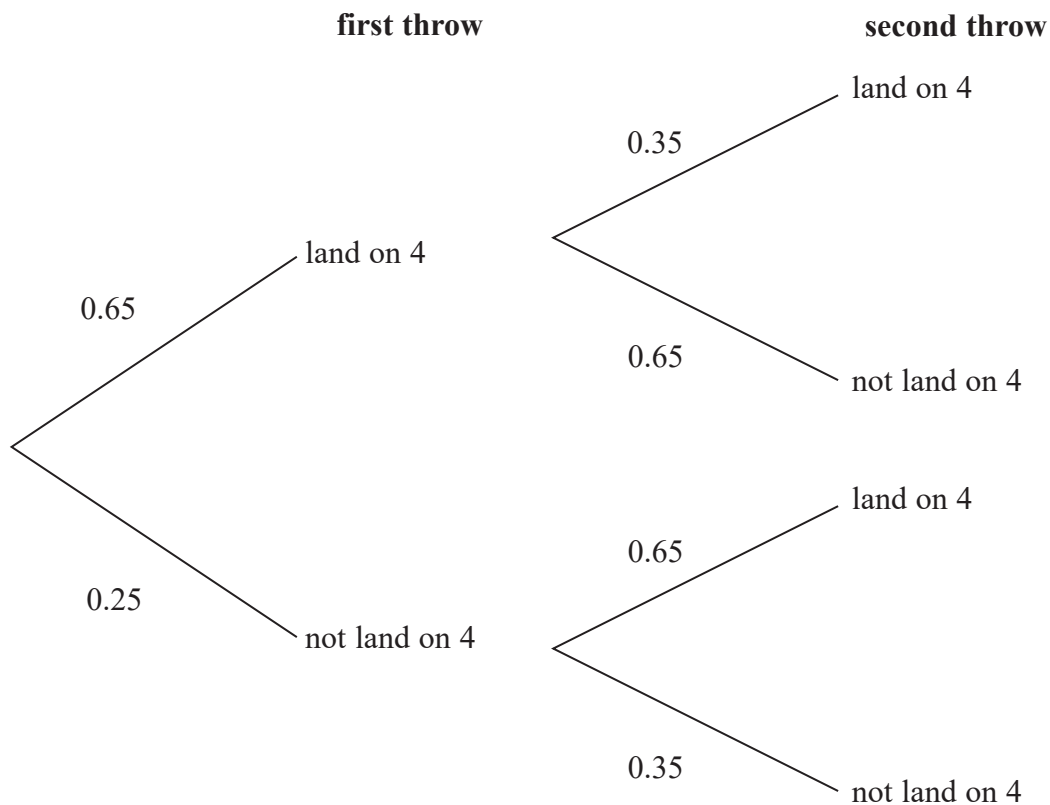
(b) Find the probability that the team will win exactly one of the two matches.

(3)

(Total for Question 11 is 5 marks)

12 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.

1.....
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2.....
.....

(Total for Question 12 is 2 marks)

13 There are some counters in a bag.
The counters are red or white or blue or yellow.

Bob is going to take at random a counter from the bag.

The table shows each of the probabilities that the counter will be blue or will be yellow.

Colour	red	white	blue	yellow
Probability			0.45	0.25

There are 18 blue counters in the bag.

The probability that the counter Bob takes will be red is twice the probability that the counter will be white.

(a) Work out the number of red counters in the bag.

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(4)

A marble is going to be taken at random from a box of marbles.
The probability that the marble will be silver is 0.5

There must be an even number of marbles in the box.

(b) Explain why.

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.....
(1)

(Total for Question 13 is 5 marks)

14 50 people were asked if they speak French or German or Spanish.

Of these people,

31 speak French

2 speak French, German and Spanish

4 speak French and Spanish but not German

7 speak German and Spanish

8 do not speak any of the languages

all 10 people who speak German speak at least one other language

Two of the 50 people are chosen at random.

Work out the probability that they both only speak Spanish.

.....
(Total for Question 14 is 5 marks)

15 There are only blue cubes, red cubes and yellow cubes in a box.

The table shows the probability of taking at random a blue cube from the box.

Colour	blue	red	yellow
Probability	0.2		

The number of red cubes in the box is the same as the number of yellow cubes in the box.

(a) Complete the table.

(2)

There are 12 blue cubes in the box.

(b) Work out the total number of cubes in the box.

.....
(2)

(Total for Question 15 is 4 marks)

16 There are only r red counters and g green counters in a bag.

A counter is taken at random from the bag.

The probability that the counter is green is $\frac{3}{7}$

The counter is put back in the bag.

2 more red counters and 3 more green counters are put in the bag.

A counter is taken at random from the bag.

The probability that the counter is green is $\frac{6}{13}$

Find the number of red counters and the number of green counters that were in the bag originally.

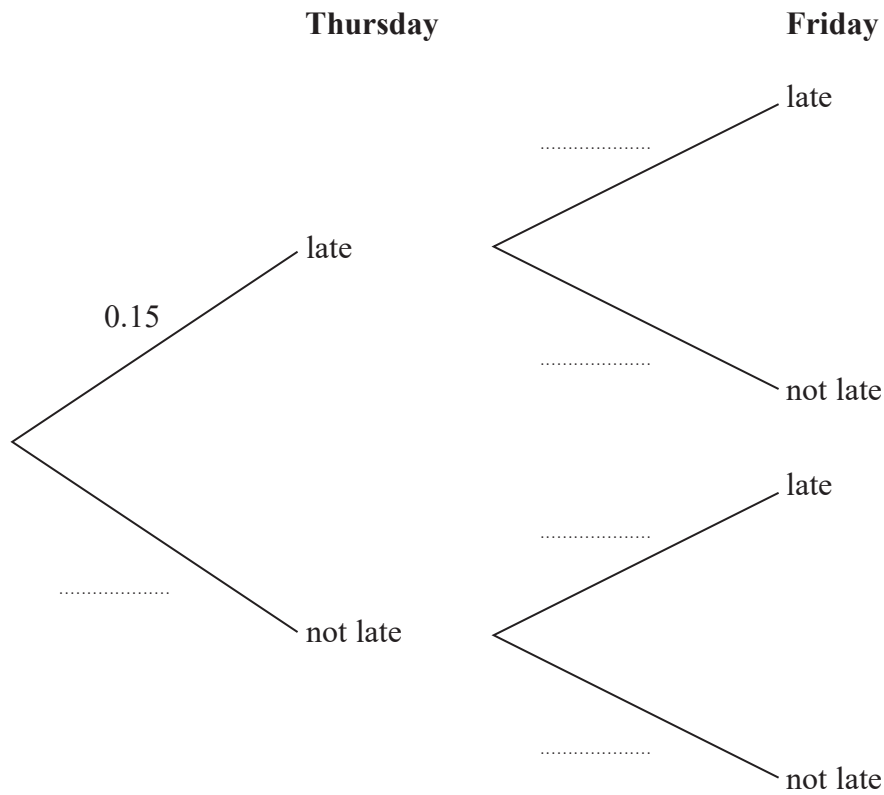
red counters.....

green counters.....

(Total for Question 16 is 5 marks)

17 Mary travels to work by train every day.
The probability that her train will be late on any day is 0.15

(a) Complete the probability tree diagram for Thursday and Friday.



(2)

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

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(3)

(Total for Question 17 is 5 marks)

18 Sally plays two games against Martin.
In each game, Sally could win, draw or lose.

In each game they play,
the probability that Sally will win against Martin is 0.3
the probability that Sally will draw against Martin is 0.1

Work out the probability that Sally will win **exactly** one of the two games against Martin.

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(Total for Question 18 is 3 marks)

19 There are four types of cards in a game.

Each card has a black circle or a white circle or a black triangle or a white triangle.



number of cards with a black shape : number of cards with a white shape = 3:5

number of cards with a circle : number of cards with a triangle = 2:7

Express the total number of cards with a black shape as a fraction of the total number of cards with a triangle.

.....
(Total for Question 19 is 3 marks)

20 There are only red sweets and yellow sweets in a bag.

There are n red sweets in the bag.

There are 8 yellow sweets in the bag.

Sajid is going to take at random a sweet from the bag and eat it.

He says that the probability that the sweet will be red is $\frac{7}{10}$

(a) Show why the probability cannot be $\frac{7}{10}$

(3)

After Sajid has taken the first sweet from the bag and eaten it, he is going to take at random a second sweet from the bag.

Given that the probability that both the sweets he takes will be red is $\frac{3}{5}$

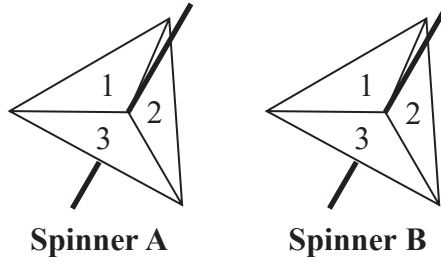
(b) work out the number of red sweets in the bag.

You must show all your working.

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(5)

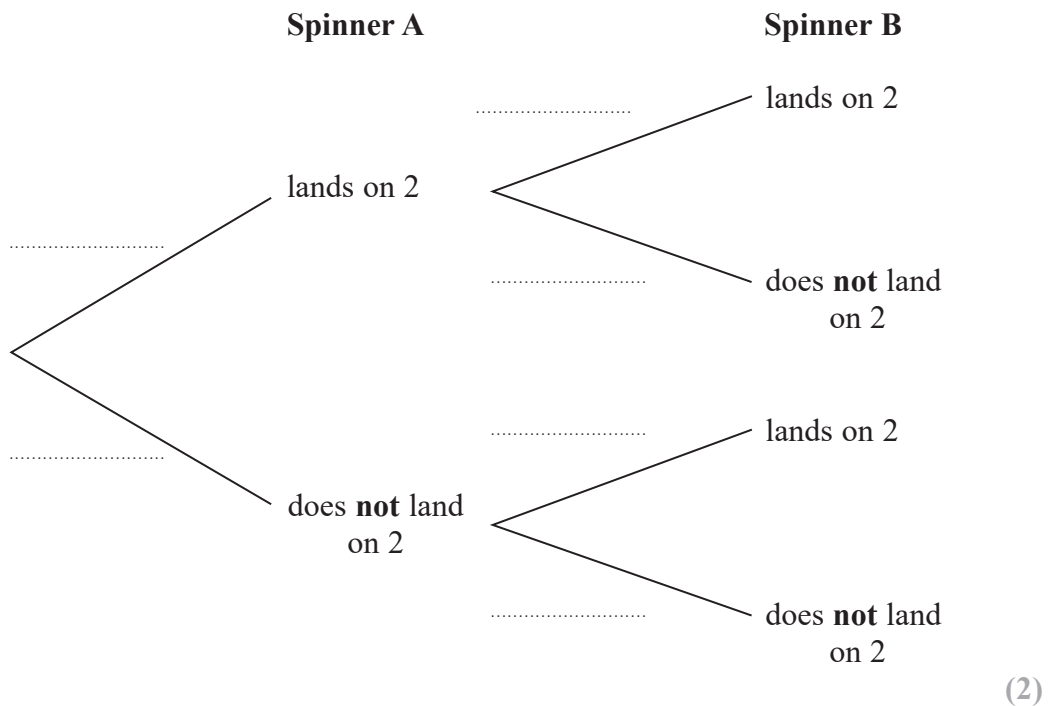
(Total for Question 20 is 8 marks)

21 Amanda has two fair 3-sided spinners.



Amanda spins each spinner once.

(a) Complete the probability tree diagram.



(b) Work out the probability that Spinner A lands on 2 and Spinner B does **not** land on 2

.....
(2)

(Total for Question 21 is 4 marks)

- 22** There are some counters in a bag.
The counters are blue or green or red or yellow.

The table shows the probabilities that a counter taken at random from the bag will be blue or will be green.

Colour	blue	green	red	yellow
Probability	0.32	0.20		

The probability that a counter taken at random from the bag will be red is five times the probability that the counter will be yellow.

There are 300 counters in the bag.

Work out the number of yellow counters in the bag.

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(Total for Question 22 is 3 marks)

23 There are only 3 red counters and 5 yellow counters in a bag.

Jude takes at random 3 counters from the bag.

Work out the probability that he takes exactly one red counter.

.....
(Total for Question 23 is 4 marks)

24 In a village,

if it rains on one day, the probability that it will rain on the next day is 0.8

if it does **not** rain on one day, the probability that it will rain on the next day is 0.6

A weather forecaster says,

“There is a 70% chance that it will rain in the village on Monday.”

Work out an estimate for the probability that it will rain in the village on Wednesday.

You must show all your working.

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(Total for Question 24 is 4 marks)

- 25 In a bag there are only red counters, blue counters, green counters and pink counters. A counter is going to be taken at random from the bag.

The table shows the probabilities of taking a red counter or a blue counter.

Colour	red	blue	green	pink
Probability	0.05	0.15

The probability of taking a green counter is 0.2 more than the probability of taking a pink counter.

- (a) Complete the table.

(2)

There are 18 blue counters in the bag.

- (b) Work out the total number of counters in the bag.

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(2)

(Total for Question 25 is 4 marks)

26 Pat throws a fair coin n times.

Find an expression, in terms of n , for the probability that Pat gets at least 1 head and at least 1 tail.

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(Total for Question 26 is 2 marks)

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27 There are only green pens and blue pens in a box.

There are three more blue pens than green pens in the box.
There are more than 12 pens in the box.

Simon is going to take at random two pens from the box.

The probability that Simon will take two pens of the same colour is $\frac{27}{55}$

Work out the number of green pens in the box.

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(Total for Question 27 is 6 marks)

28 There are only red counters and blue counters in a bag.

Joe takes at random a counter from the bag.
The probability that the counter is red is 0.65
Joe puts the counter back into the bag.

Mary takes at random a counter from the bag.
She puts the counter back into the bag.

(a) What is the probability that Joe and Mary take counters of different colours?

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.....
(2)

There are 78 red counters in the bag.

(b) How many blue counters are there in the bag?

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(2)

(Total for Question 28 is 4 marks)

29 Marek has 9 cards.

There is a number on each card.



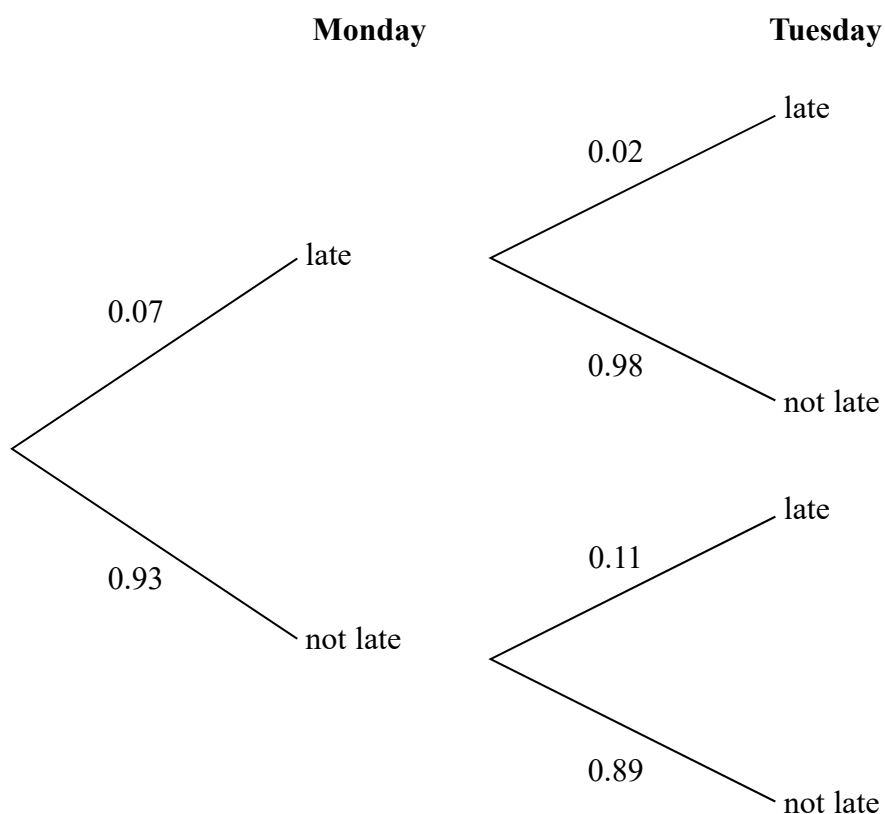
Marek takes at random two of the cards.

He works out the product of the numbers on the two cards.

Work out the probability that the product is an even number.

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(Total for Question 29 is 3 marks)

- 30 The probability tree diagram shows the probabilities that Bismah will be late for work on two days next week.



Calculate the probability that Bismah will be late on exactly one of the two days.

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(Total for Question 30 is 3 marks)

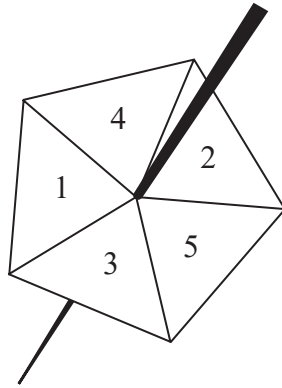
31 When a biased coin is thrown 4 times, the probability of getting 4 heads is $\frac{16}{81}$

Work out the probability of getting 4 tails when the coin is thrown 4 times.

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(Total for Question 31 is 2 marks)

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32 Lina spins a biased 5-sided spinner 40 times.



Here are her results.

Score	1	2	3	4	5
Frequency	6	8	9	7	10

Lina is now going to spin the spinner another two times.

(a) Work out an estimate for the probability that she gets a score of 5 both times.

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(2)

Derek is going to spin the spinner a large number of times.

(b) Work out an estimate for the percentage of times Derek can expect to get a score of 1

.....%

(2)

(Total for Question 32 is 4 marks)

33 Alfie has 11 cards.

He has

3 blue cards

7 green cards

and 1 white card.

Alfie takes at random 2 of these cards.

Work out the probability that he takes cards of different colours.

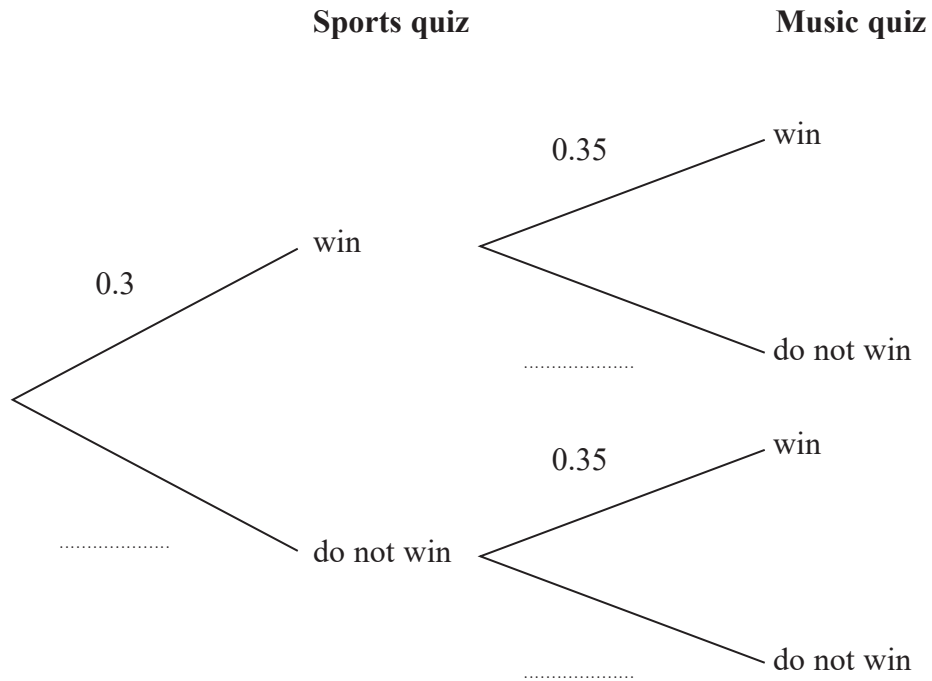
.....
(Total for Question 33 is 3 marks)

34 One weekend the Keddie family is going to do a sports quiz and a music quiz.

The probability that the family will win the sports quiz is 0.3

The probability that the family will win the music quiz is 0.35

(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that the Keddie family will win both the sports quiz and the music quiz.

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(2)

(Total for Question 34 is 4 marks)

35 There are only blue counters, red counters and green counters in a box.

The probability that a counter taken at random from the box will be blue is 0.4

The ratio of the number of red counters to the number of green counters is 7 : 8

Sameena takes at random a counter from the box.

She records its colour and puts the counter back in the box.

Sameena does this a total of 50 times.

Work out an estimate for the number of times she takes a green counter.

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(Total for Question 35 is 3 marks)

- 36** A first aid test has two parts, a theory test and a practical test.
The probability of passing the theory test is 0.75
The probability of passing only one of the two parts is 0.36

The two events are independent.

Work out the probability of passing the practical test.

.....
(Total for Question 36 is 4 marks)

37 Ray has nine cards numbered 1 to 9



Ray takes at random three of these cards.

He works out the sum of the numbers on the three cards and records the result.

Work out the probability that the result is an even number.

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(Total for Question 37 is 4 marks)