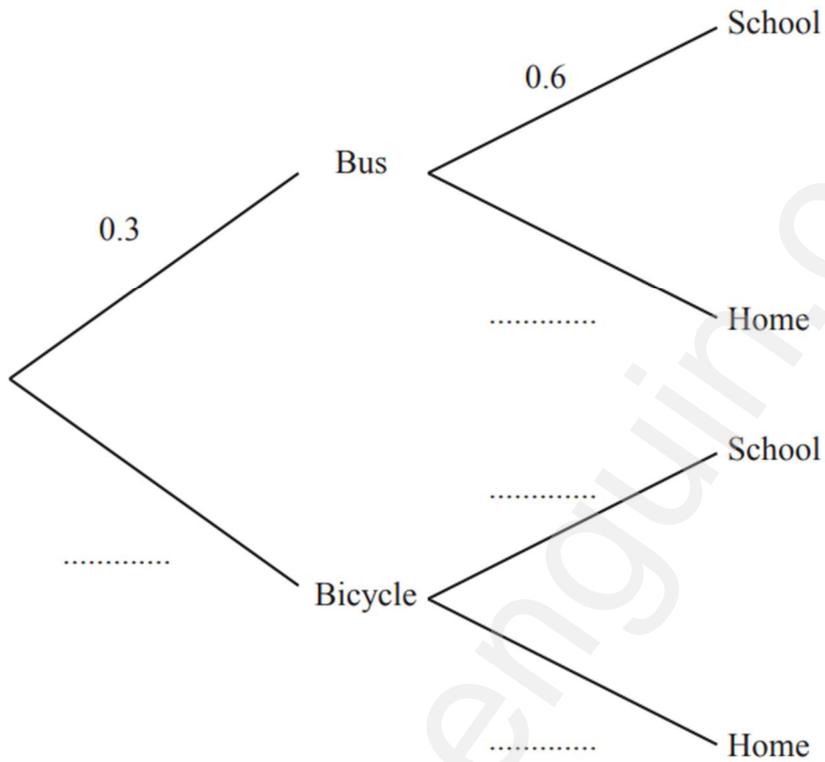


- 7 Iraj travels to school either by bus or on a bicycle.
 The probability that he goes by bus is 0.3 .
 He can have lunch at home or at school.
 The probability that he has lunch at school is 0.6 .

(a) Complete the tree diagram.



[2]

- (b) Find the probability that Iraj travels on a bicycle to school and goes home for lunch.

..... [2]

7 Karen has 3 blue hats, 5 red hats and 2 white hats.
She also has 4 blue scarves, 3 red scarves and 1 white scarf.

(a) Karen takes a hat at random and replaces it.

Find the probability that it is white.

..... [1]

(b) Karen takes a hat and a scarf at random.

Find the probability that both the hat and the scarf are blue.

..... [2]

15 A bag has 5 black counters, 4 white counters and 1 red counter.
One counter is chosen at random and is replaced.
A second counter is then chosen at random.

Find the probability that the two counters chosen are different colours.

..... [4]

- (b)** Scott takes an examination.
The examination is in two parts, a theory test and a practical test.
Both parts must be passed to pass the examination.

The probability that Scott passes the theory test is 0.9 .
The probability that Scott passes the practical test is 0.8 .

Find the probability that

- (i)** Scott passes the examination,

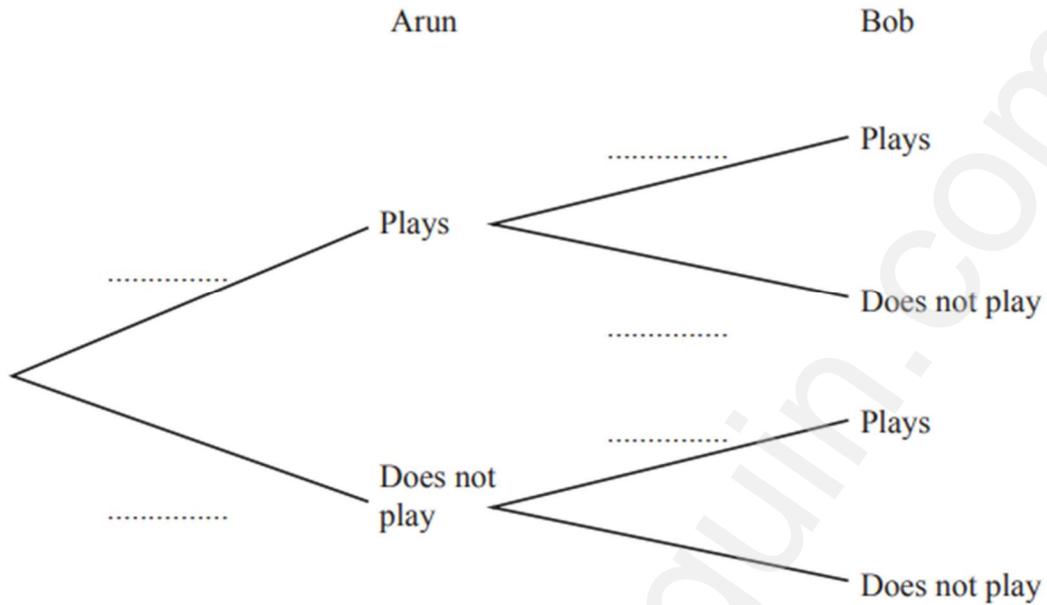
..... [2]

- (ii)** Scott passes the theory test or the practical test but not both.

..... [3]

- 7 On any Saturday, the probability that Arun plays football is $\frac{3}{4}$.
 On any Saturday, the probability that Bob plays football is $\frac{2}{5}$.

(a) (i) Complete the tree diagram.



[2]

(ii) Calculate the probability that, one Saturday, Arun and Bob both play football.

..... [2]

(iii) Calculate the probability that, one Saturday, either Arun plays football or Bob plays football, but not both.

..... [3]

14 An archer shoots three arrows at a target.

The probability that she hits the target with each arrow is $\frac{7}{10}$.

Find the probability she hits the target exactly twice.

..... [3]

- 17 An unbiased die is numbered 2, 3, 3, 4, 5, 6.
Wendy rolls the die three times.

Find the probability that Wendy rolls a prime number at least twice.

..... [4]

- 19 Katy picks a number at random from the numbers 2, 3 and 5.
She then picks a number at random from the numbers 5, 6, 7 and 9.
When she adds the two numbers the answer is even.

Find the probability that **exactly one** of the numbers picked is a 5.

..... [3]

- 12 Bag A contains balls numbered 2, 4, 4, 4.
Bag B contains balls numbered 1, 1, 2, 3, 4, 4.
Bag C contains balls numbered 1, 2, 3, 4.

One of these three bags is chosen at random.
A ball is chosen at random from this bag.

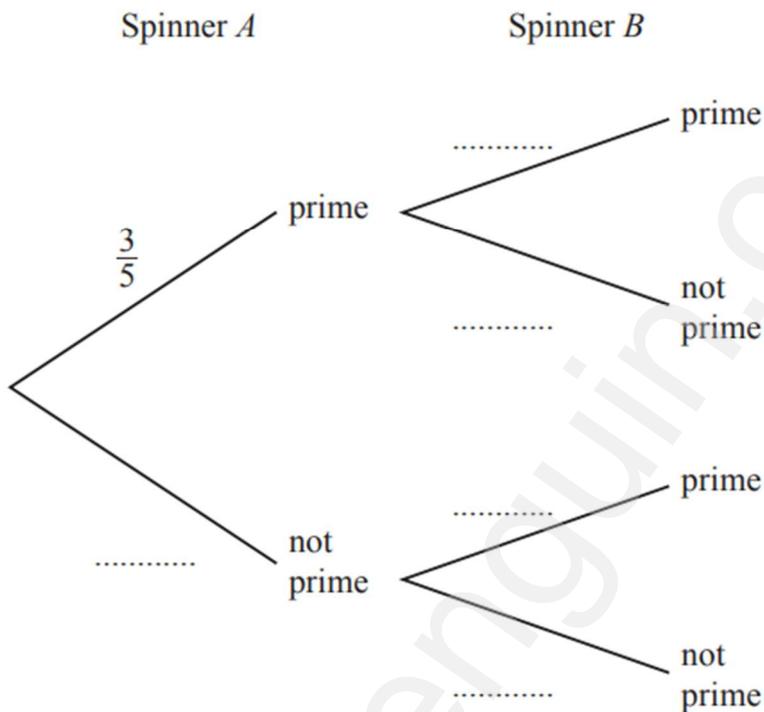
Find the probability that the ball chosen is numbered 4.
Give your answer as a fraction.

..... [3]

- 4 (a) Lucia has two fair spinners.
 Spinner *A* is five-sided and is numbered 1, 2, 3, 4, 5.
 Spinner *B* is nine-sided and is numbered 3, 3, 3, 4, 4, 4, 4, 5, 5.

Lucia spins the two spinners and records whether they land on a prime number.

- (i) Complete the tree diagram.



[2]

- (ii) Find the probability that

- (a) the two numbers are both prime

..... [2]

- (b) the two numbers are **not** both prime.

..... [1]

(b) Lucia spins Spinner A 120 times.

(continued from previous page)

Find the expected number of times the spinner lands on a prime number.

..... [1]

(d) Lucia keeps spinning Spinner B until it lands on a 4.

Find an expression, in terms of n , for the probability that this happens on the n th spin.

..... [2]

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7 On any day the probability that it rains is $\frac{1}{3}$.

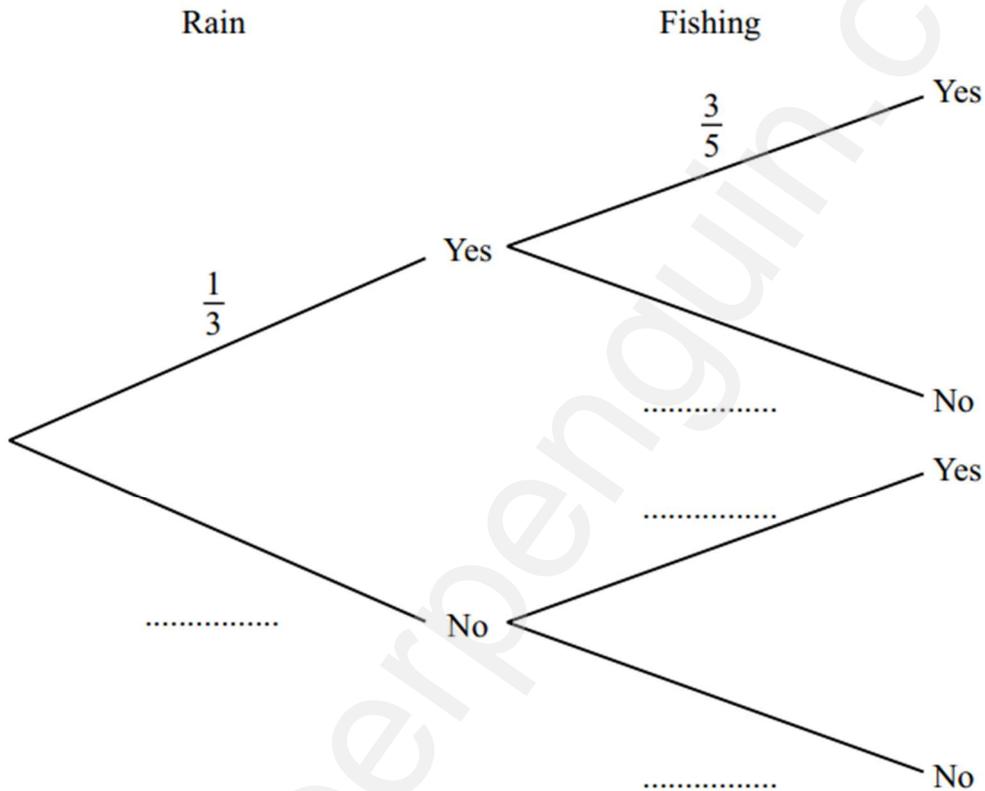
When it rains the probability that Amira goes fishing is $\frac{3}{5}$.

When it does not rain the probability that Amira goes fishing is $\frac{3}{4}$.

(a) In a period of 60 days on how many days is it expected to rain?

..... [1]

(b) Complete the tree diagram.



[2]

(c) Find the probability that on any day Amira goes fishing.

..... [3]

26 Malik goes to a shop every day to buy bread.

On any day, the probability that Malik goes to the shop in the morning is 0.7 .

If he goes in the morning, the probability that there is bread for Malik to buy is 0.95 .

If he goes later, the probability that there is bread for Malik to buy is 0.6 .

Calculate the probability that, on any day, there is bread for Malik to buy.

..... [3]

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- 12** A bag contains 12 discs.
7 discs are red and 5 discs are green.
A disc is picked at random and not replaced.
A second disc is then picked at random.

Find the probability that

- (a)** both discs are green,

..... [2]

- (b)** at least one disc is green.

..... [3]

- 13 Sara has a bag containing 4 yellow balls and 5 white balls.
Sara takes a ball from the bag at random without replacement.
She then takes a second ball from the bag at random.

Find the probability that the two balls are different colours.

..... [3]

9



Ulrich has these cards.
He picks 2 cards at random without replacement.

Find the probability that both cards have the letter *A*.

..... [2]

- 25** A bag contains 2 green buttons, 5 red buttons and 6 blue buttons.
Two buttons are taken at random from the bag without replacement.

Calculate the probability that the two buttons are different colours.

..... [4]

- 13** A bag contains 12 discs.
There are 2 red discs, 4 blue discs, 5 green discs and 1 yellow disc.
A disc is chosen at random and not replaced.
A second disc is then chosen at random.

Find the probability that both discs are the same colour.

..... [3]

- 17 A bag contains 3 blue buttons, 8 white buttons and 5 red buttons.
Two buttons are picked at random from the bag, without replacement.

Work out the probability that the two buttons are either both red or both white.

..... [3]

- 15 The height of each of 140 basketball players is recorded.
The table shows the results.

Height (h cm)	$160 < h \leq 180$	$180 < h \leq 185$	$185 < h \leq 190$	$190 < h \leq 200$	$200 < h \leq 210$
Frequency	7	12	31	70	20

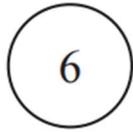
- (b) Two of the players are chosen at random.

Find the probability that both players have a height greater than 190 cm and no more than 200 cm.

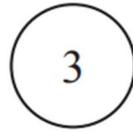
..... [2]



Red



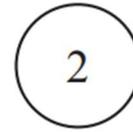
Yellow



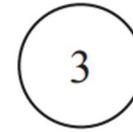
Blue



Blue



Yellow



Blue

The diagram shows six discs.
Each disc has a colour and a number.

(b) Two of the six discs are picked at random **without** replacement.

Find the probability that

(i) both discs have the number 3,

..... [2]

(ii) both discs have the same colour.

..... [3]

(c) Two of the six discs are picked at random **with** replacement.

Find the probability that both discs have the same colour.

..... [3]

24 The probability of Jamie hitting a target is $\frac{1}{3}$.

The probability that he hits the target for the first time on his n th attempt is $\frac{64}{2187}$.

Find the value of n .

$n = \dots\dots\dots$ [2]

23 Bag A and bag B each contain red sweets and yellow sweets.

Anna picks a sweet at random from bag A .

Ben picks a sweet at random from bag B .

The probability that Anna picks a red sweet is $\frac{2}{5}$.

The probability Anna and Ben both pick a yellow sweet is $\frac{1}{10}$.

Find the probability that Anna and Ben both pick a red sweet.

$\dots\dots\dots$ [3]

25 A bag contains 5 red balls, 4 blue balls and 3 green balls.

(a) (i) Megan picks a ball at random.

Write down the probability that the ball is red or blue.

..... [1]

(ii) Megan replaces the ball.

She picks a ball at random, notes the colour and replaces the ball.

She repeats this 60 times.

Calculate the number of times the ball is expected to be red or blue.

..... [1]

(b) Mick picks 2 of the 12 balls at random, without replacement.

Calculate the probability that the balls are different colours.

..... [4]

(c) Marie picks balls at random, without replacement, from the 12 balls.

When she picks a green ball she stops.

The probability that she picks a green ball on pick n is $\frac{21}{220}$.

Find the value of n .

$n =$ [2]

10 (a) Sarah spins a fair four-sided spinner numbered 0, 1, 1 and 3.

(i) What number is the spinner most likely to land on?

..... [1]

(ii) Sarah spins the spinner twice.

Find the probability that it lands on the number 1 both times.

..... [2]

(iii) Sarah spins the spinner until it lands on the number 3.

The probability that this happens on the n th spin is $\frac{729}{16384}$.

Find the value of n .

$n =$ [2]

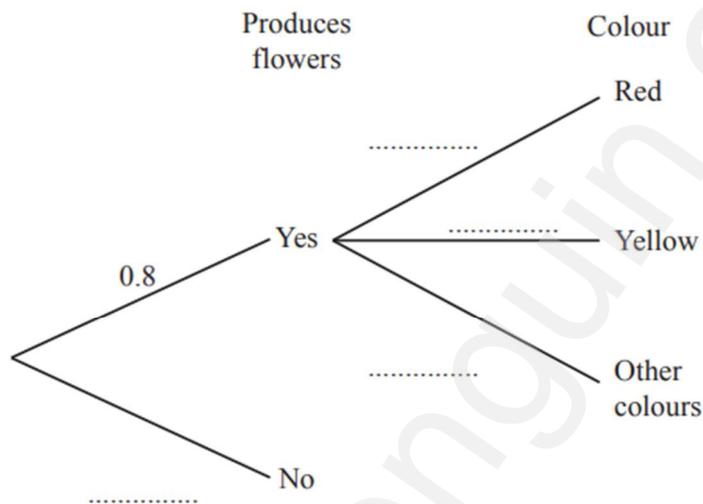
- 7 Tanya plants some seeds.
 The probability that a seed will produce flowers is 0.8 .
 When a seed produces flowers, the probability that the flowers are red is 0.6 and the probability that the flowers are yellow is 0.3 .

- (a) Tanya has a seed that produces flowers.

Find the probability that the flowers are not red and not yellow.

..... [1]

- (b) (i) Complete the tree diagram.



[2]

- (ii) Find the probability that a seed chosen at random produces red flowers.

..... [2]

- (iii) Tanya chooses a seed at random.

Find the probability that this seed does not produce red flowers and does not produce yellow flowers.

..... [3]

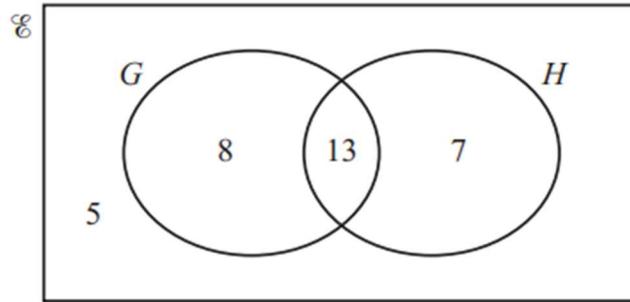
(c) Two of the seeds are chosen at random.

(continued from previous page)

Find the probability that one produces flowers and one does not produce flowers.

..... [3]

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\mathcal{U} = {number of students in a class}

G = {number of students who study geography}

H = {number of students who study history}

The Venn diagram shows information about the 33 students in a class.

(a) One of the students in the class is picked at random.

Find the probability that this student

(i) does not study geography and does not study history

..... [1]

(ii) studies geography and studies history.

..... [1]

(b) Two of the students who study history are picked at random.

Find the probability that one student also studies geography and one student does not study geography.

..... [3]