1. Julie does a statistical experiment. She throws a dice 600 times.
She scores six 200 times.

(a) Is the dice fair? Explain your answer.

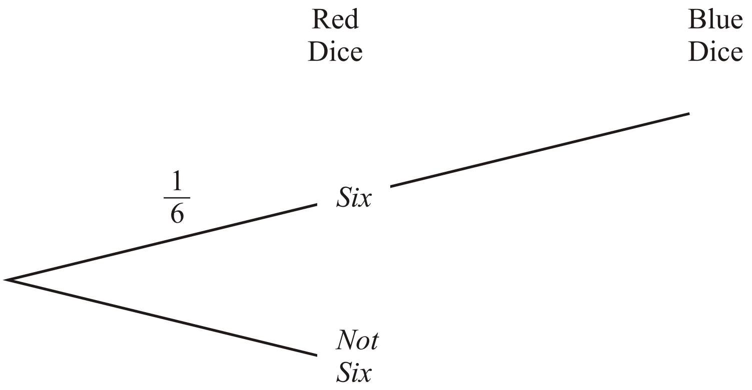
....

....

(1)

Julie then throws a fair red dice once and a fair blue dice once.

(b) Complete the probability tree diagram to show the outcomes.
Label clearly the branches of the probability tree diagram.
The probability tree diagram has been started in the space below.



(3)
(Total 4 marks)

2. Julie does a statistical experiment. She throws a dice 600 times.
She scores six 200 times.

(a) Is the dice fair? Explain your answer.

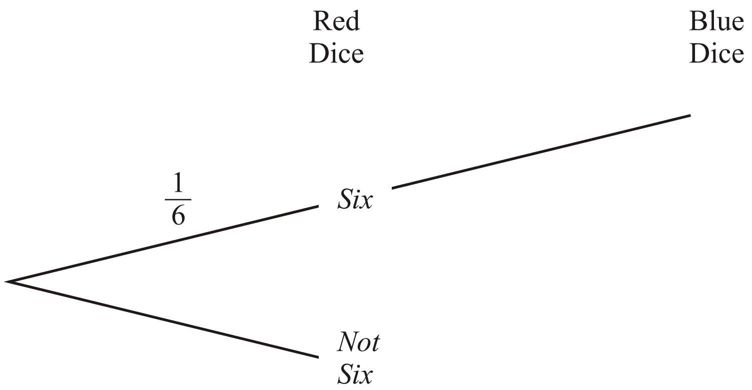
....

....

(1)

Julie then throws a fair red dice once and a fair blue dice once.

(b) Complete the probability tree diagram to show the outcomes.
Label clearly the branches of the probability tree diagram.
The probability tree diagram has been started in the space below.



(3)

(c) (i) Julie throws a fair red dice once and a fair blue dice once. Calculate the probability that Julie gets a six on both the red dice and the blue dice.

....

(ii) Calculate the probability that Julie gets at least one six.

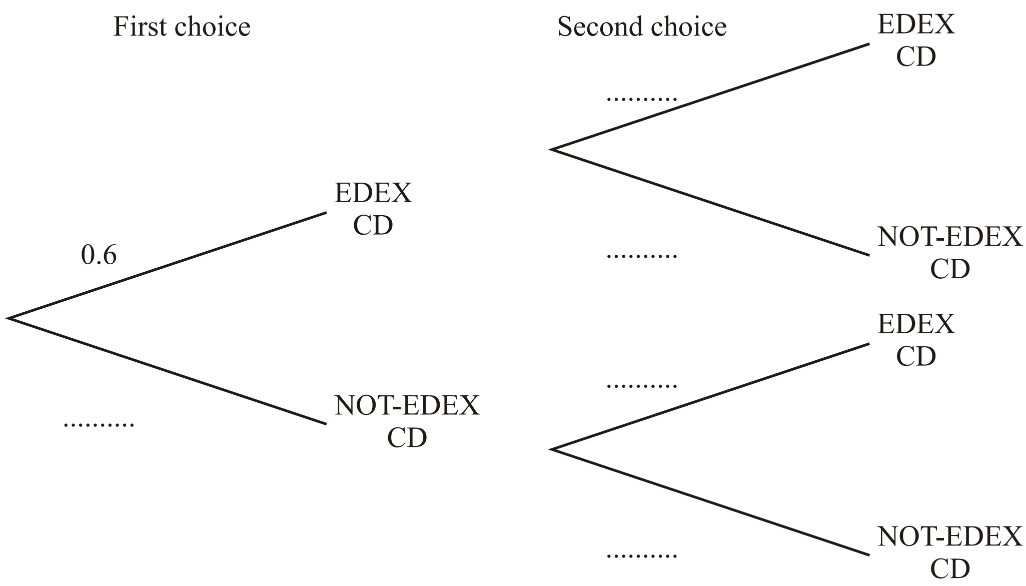
....

(5)
(Total 9 marks)

3. Amy has 10 CDs in a CD holder.
Amy's favourite group is Edex.
She has 6 Edex CDs in the CD holder.

Amy takes one of these CDs at random.
She writes down whether or not it is an Edex CD.
She puts the CD back in the holder.
Amy again takes one of these CDs at random.

(a) Complete the probability tree diagram.



(2)

Amy had 30 CDs.
The mean playing time of these 30 CDs was 42 minutes.

Amy sold 5 of her CDs.
The mean playing time of the 25 CDs left was 42.8 minutes.

(b) Calculate the mean playing time of the 5 CDs that Amy sold.

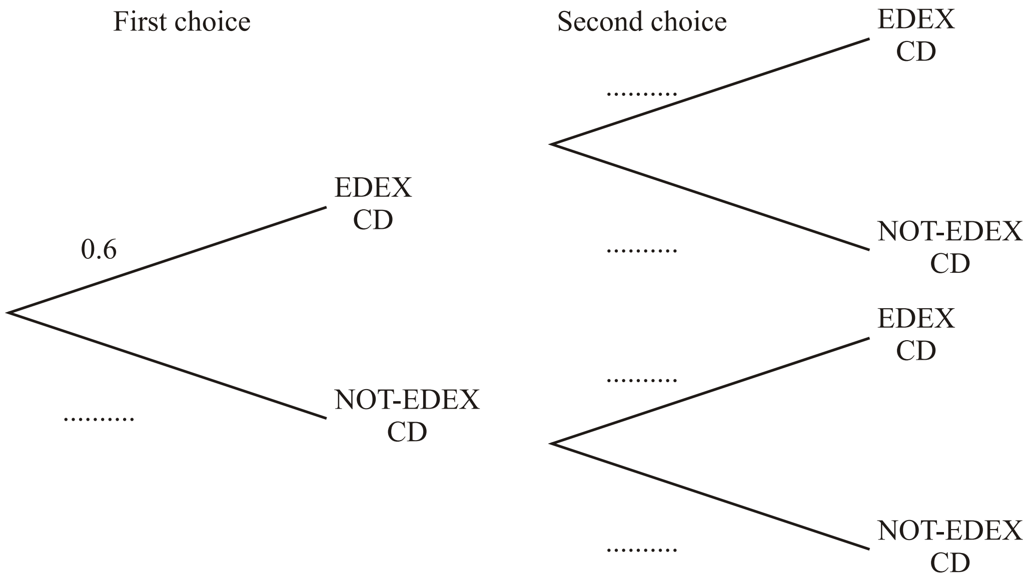
.... minutes

(3)
(Total 5 marks)

4. Amy has 10 CDs in a CD holder.
Amy's favourite group is Edex.
She has 6 Edex CDs in the CD holder.

Amy takes one of these CDs at random.
She writes down whether or not it is an Edex CD.
She puts the CD back in the holder.
Amy again takes one of these CDs at random.

(a) Complete the probability tree diagram.



(2)

(b) Find the probability that Amy will pick two Edex CDs.

....

(2)

Amy had 30 CDs.
The mean playing time of these 30 CDs was 42 minutes.

Amy sold 5 of her CDs.
The mean playing time of the 25 CDs left was 42.8 minutes.

(c) Calculate the mean playing time of the 5 CDs that Amy sold.

.... minutes
(3)
(Total 7 marks)

5. In a game of chess, you can win, draw or lose.

Gary plays two games of chess against Mijan.

The probability that Gary will win any game against Mijan is 0.55
The probability that Gary will win draw game against Mijan is 0.3

(a) Work out the probability that Gary will win **exactly** one of the two games against Mijan.

....
(3)

In a game of chess, you score

1 point for a win
$\frac{1}{2}$ point for a draw,
0 points for a loss.

(b) Work out the probability that after two games, Gary’s total score will be the same as Mijan’s total score.

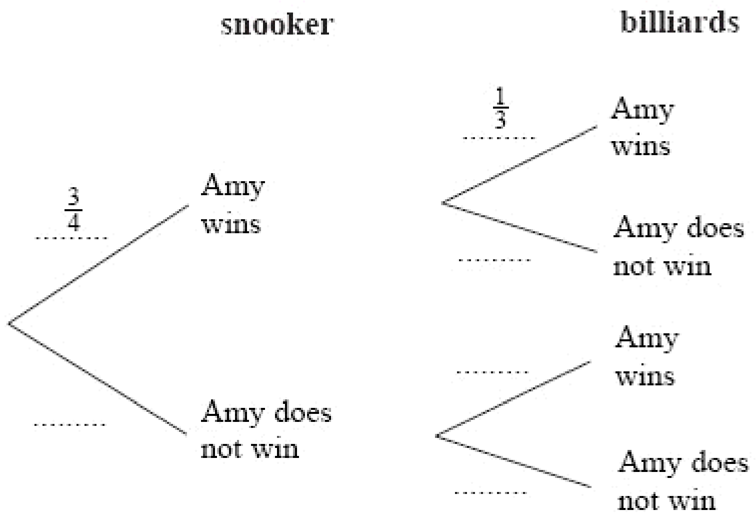
....
(3)
(Total 6 marks)

6. Amy is going to play one game of snooker and one game of billiards.

The probability that she will win the game of snooker is $\frac{3}{4}$

The probability that she will win the game of billiards is $\frac{1}{3}$

Complete the probability tree diagram.



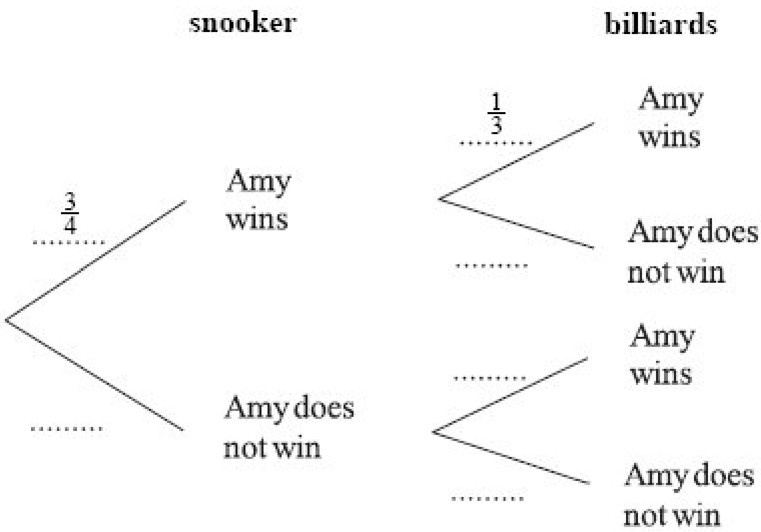
(Total 2 marks)

7. Amy is going to play one game of snooker and one game of billiards.

The probability that she will win the game of snooker is $\frac{3}{4}$

The probability that she will win the game of billiards is $\frac{1}{3}$

(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that Amy will win **exactly** one game.

……………………

(3)

Amy played one game of snooker and one game of billiards on a number of Fridays.
She won at **both** snooker and billiards on 21 Fridays.

(c) Work out an estimate for the number of Fridays on which Amy did not win either game.

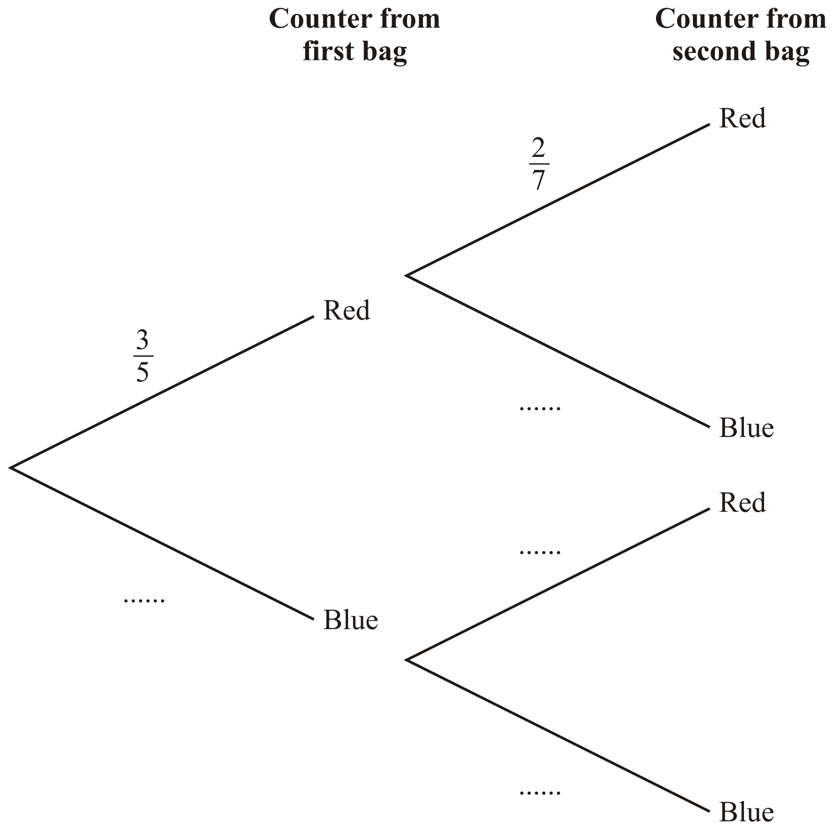
……………………

(3)
(Total 8 marks)

8. Loren has two bags.
The first bag contains 3 red counters and 2 blue counters.
The second bag contains 2 red counters and 5 blue counters.

Loren takes one counter at random from each bag.

Complete the probability tree diagram.

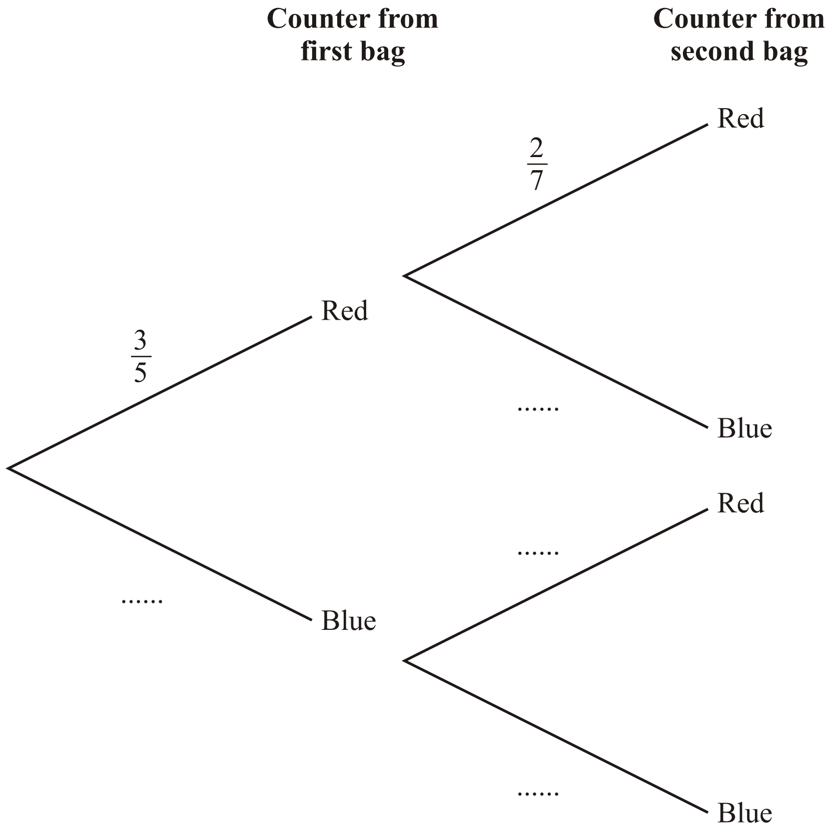


(Total 2 marks)

9. Loren has two bags.
The first bag contains 3 red counters and 2 blue counters.
The second bag contains 2 red counters and 5 blue counters.

Loren takes one counter at random from each bag.

(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that Loren takes one counter of each colour.

....

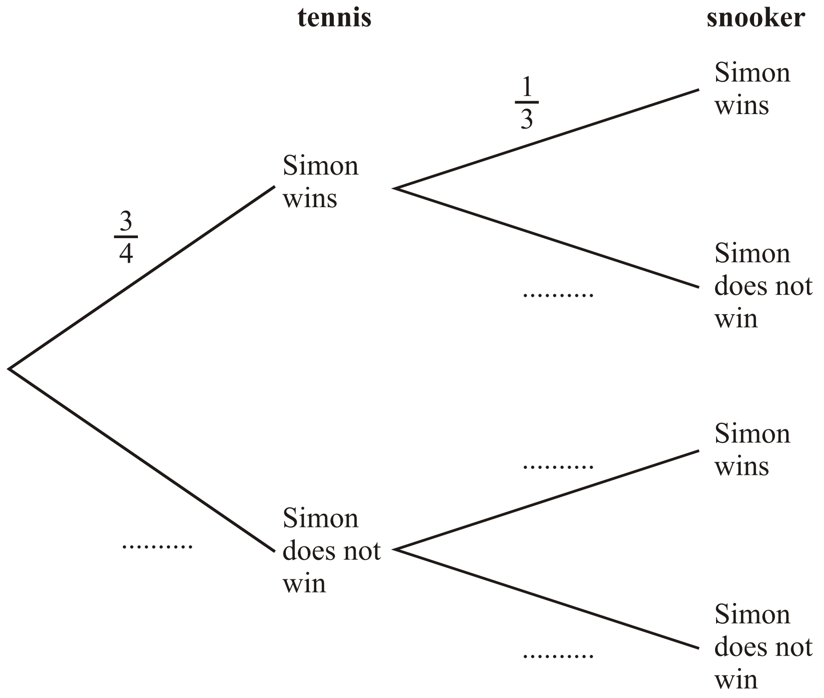
(3)
(Total 5 marks)

10. Simon plays one game of tennis and one game of snooker.

The probability that Simon will win at tennis is $\frac{3}{4}$

The probability that Simon will win at snooker is $\frac{1}{3}$

Complete the probability tree diagram.



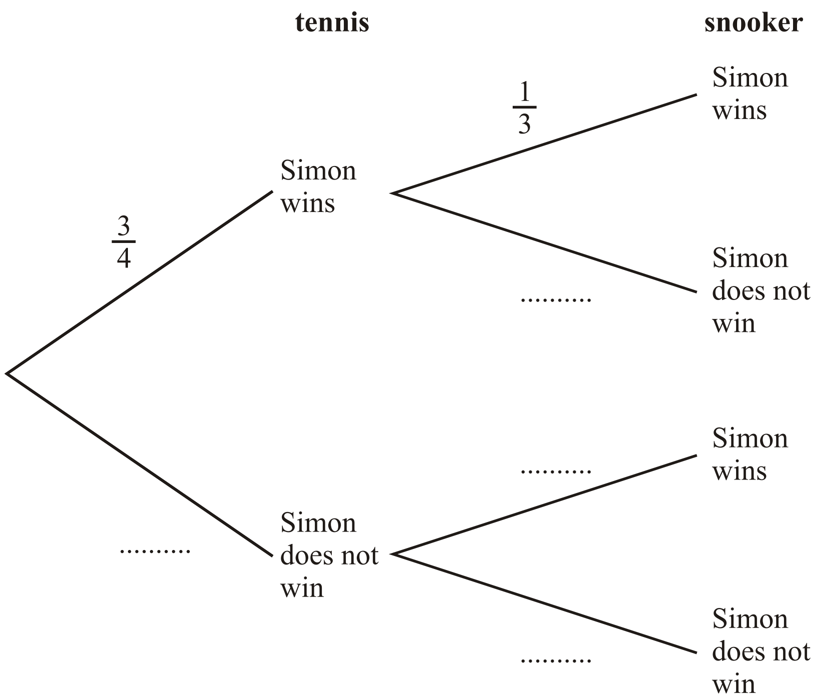
(Total 2 marks)

11. Simon plays one game of tennis and one game of snooker.

The probability that Simon will win at tennis is $\frac{3}{4}$

The probability that Simon will win at snooker is $\frac{1}{3}$

(a) Complete the probability tree diagram below.



(2)

(b) Work out the probability that Simon wins both games.

....

(2)

(c) Work out the probability that Simon will win only one game.

....

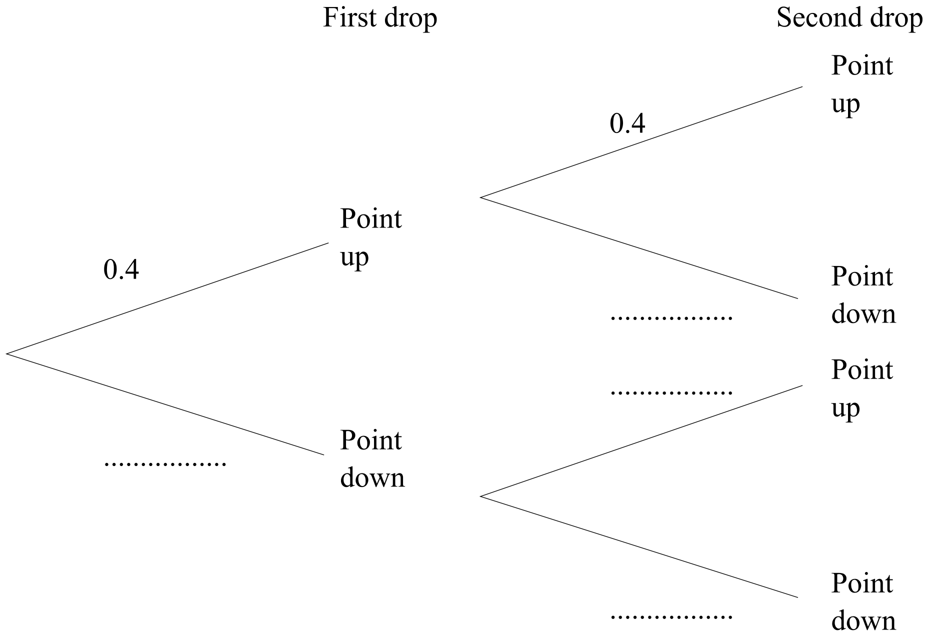
(3)

(Total 7 marks)

12. Mary has a drawing pin.
When the drawing pin is dropped it can land either 'point up' or 'point down'.
The probability of it landing 'point up' is 0.4

Mary drops the drawing pin twice.

(a) Complete the probability tree diagram.



(2)

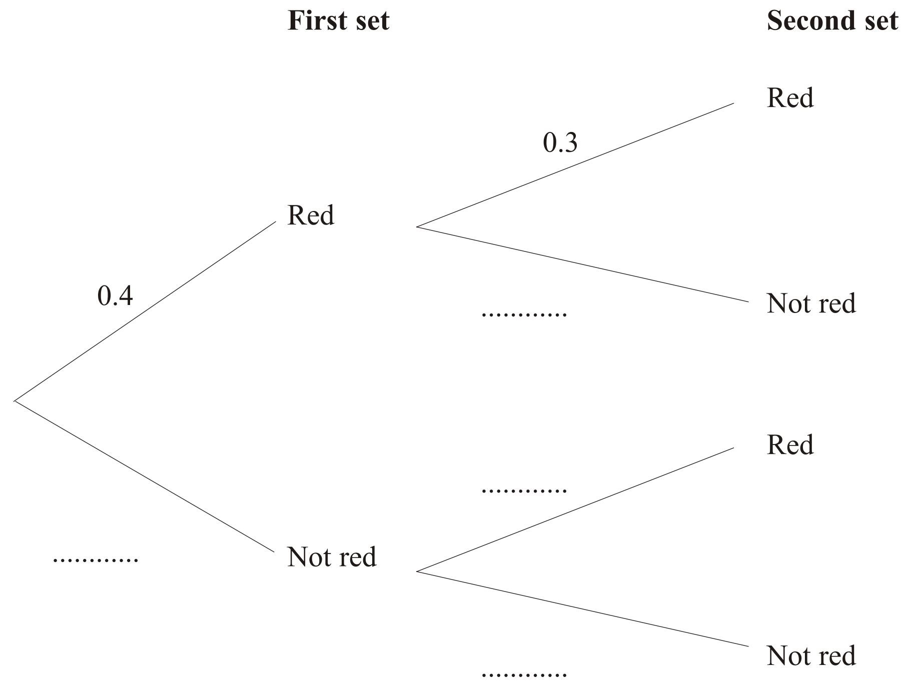
(b) Work out the probability that the drawing pin will land 'point up' both times.

....

(2)
(Total 4 marks)

13. There are two sets of traffic lights on Georgina’s route to school.
The probability that the first set of traffic lights will be red is 0.4
The probability that the second set of traffic lights will be red is 0.3

(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that both sets of traffic lights will be red.

....

(2)

(c) Work out the probability that exactly one set of traffic lights will be red.

....

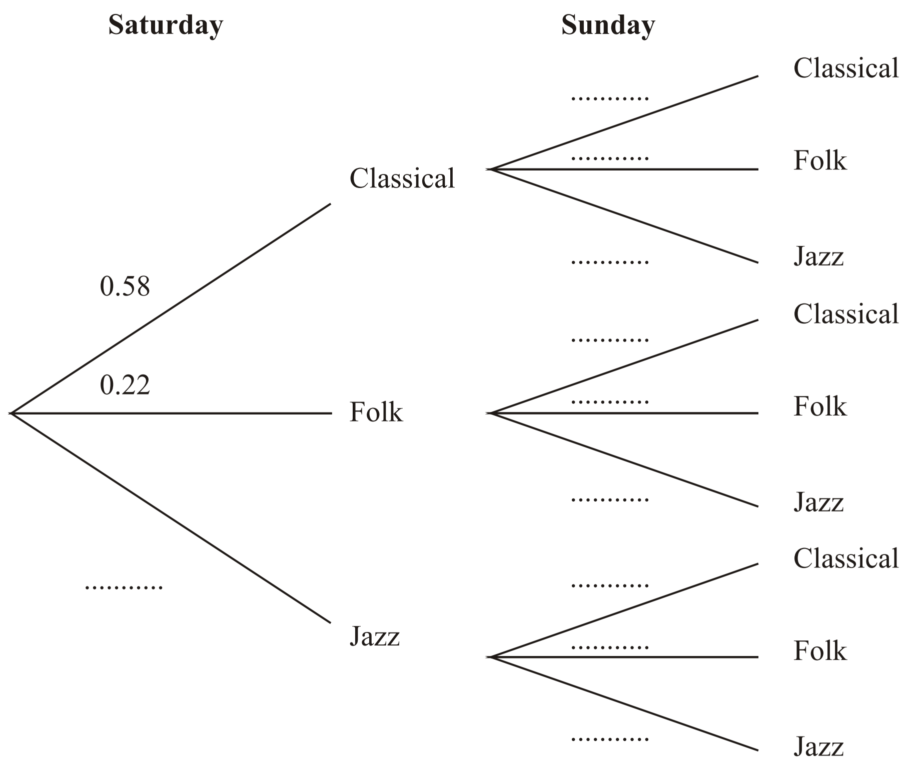
(3)
(Total 7 marks)

14. Julie has 100 music CDs.
58 of the CDs are classical.
22 of the CDs are folk.
The rest of the CDs are jazz.

On Saturday, Julie chooses one CD at random from the 100 CDs.
On Sunday, Julie chooses one CD at random from the 100 CDs.

(a) Complete the probability tree diagram.

(2)



(b) Calculate the probability that Julie will choose a jazz CD on **both** Saturday and Sunday.

....

(2)

(c) Calculate the probability that Julie will choose at least one jazz CD on Saturday and Sunday.

....

(3)

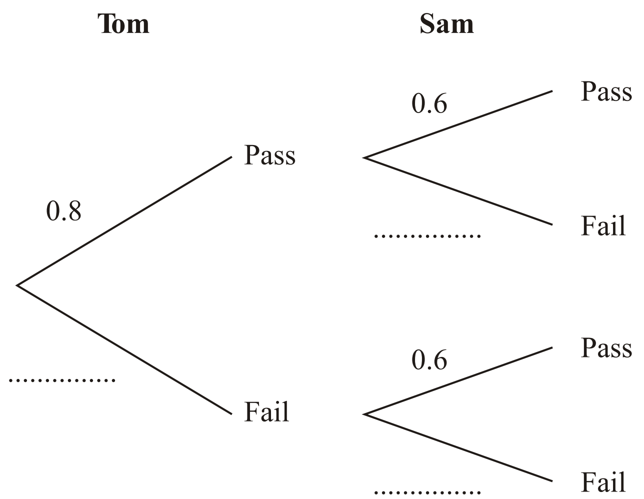
(Total 7 marks)

15. Tom and Sam each take a driving test.

The probability that Tom will pass the driving test is 0.8

The probability that Sam will pass the driving test is 0.6

(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that both Tom and Sam will pass the driving test.

....

(2)

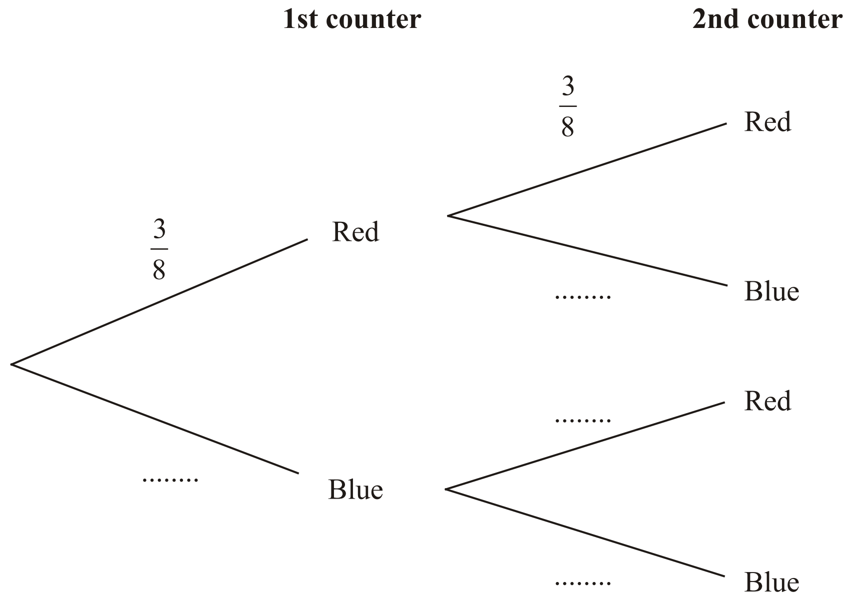
(c) Work out the probability that only one of them will pass the driving test.

....

(3)
(Total 7 marks)

16. Matthew puts 3 red counters and 5 blue counters in a bag.
He takes at random a counter from the bag.
He writes down the colour of the counter.
He puts the counter in the bag again.
He then takes at random a second counter from the bag.

(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that Matthew takes two red counters.

....

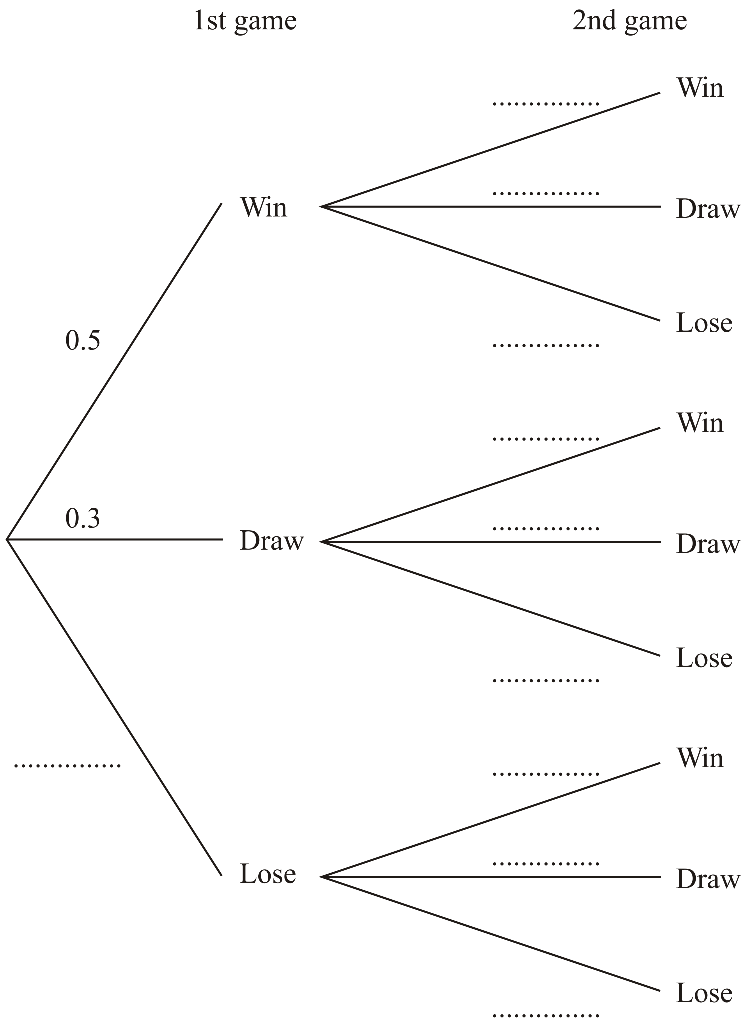
(2)
(Total 4 marks)

17. In a game of chess, a player can either win, draw or lose.

The probability that Vishi wins any game of chess is 0.5
The probability that Vishi draws any game of chess is 0.3

Vishi plays 2 games of chess.

(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that Vishi will win both games.

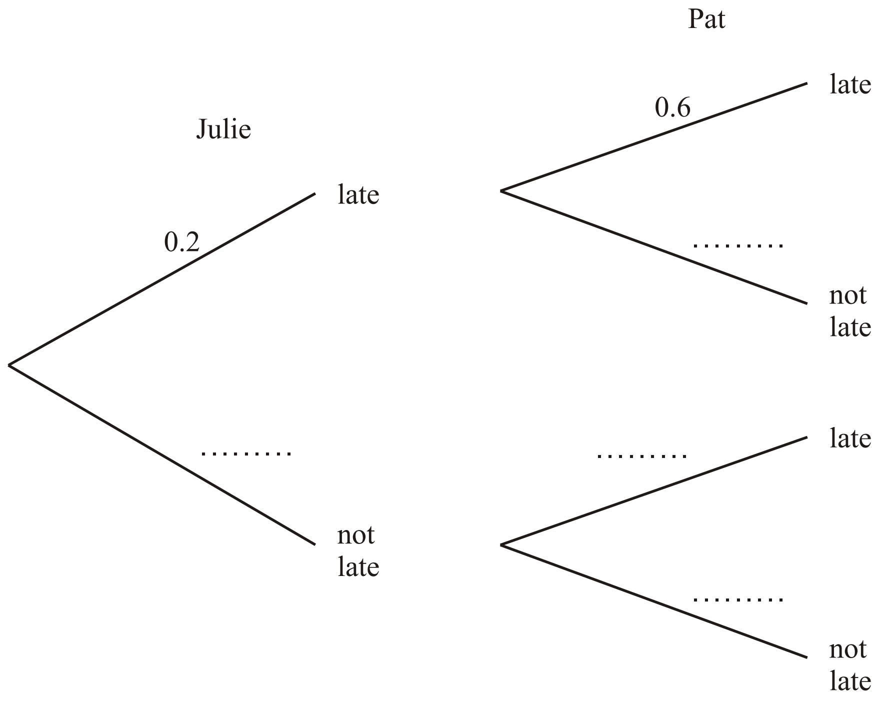
....

(2)
(Total 4 marks)

18. Julie and Pat are going to the cinema.

The probability that Julie will arrive late is 0.2
The probability that Pat will arrive late is 0.6
The two events are independent.

(a) Complete the diagram.



(2)

(b) Work out the probability that Julie and Pat will both arrive late.

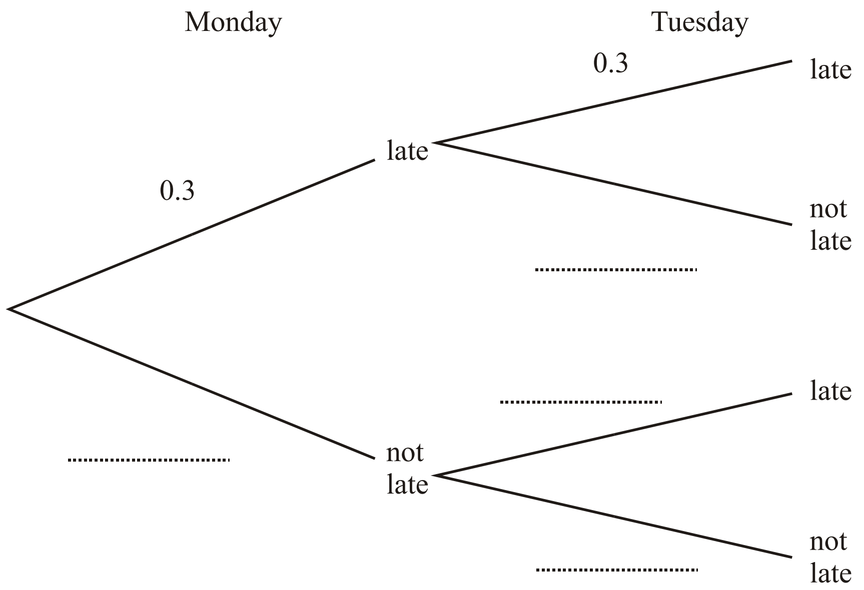
……………………………

(2)
(Total 4 marks)

19. Salika travels to school by train every day.

The probability that her train will be late on any day is 0.3

(a) Complete the probability tree diagram for Monday and Tuesday.



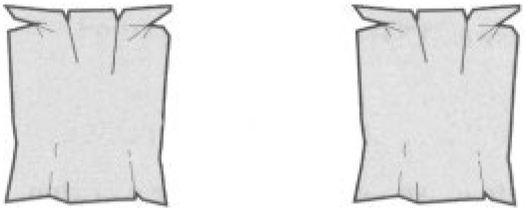
(2)

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

....

(3)
(Total 5 marks)

20. Jacob has 2 bags of sweets.

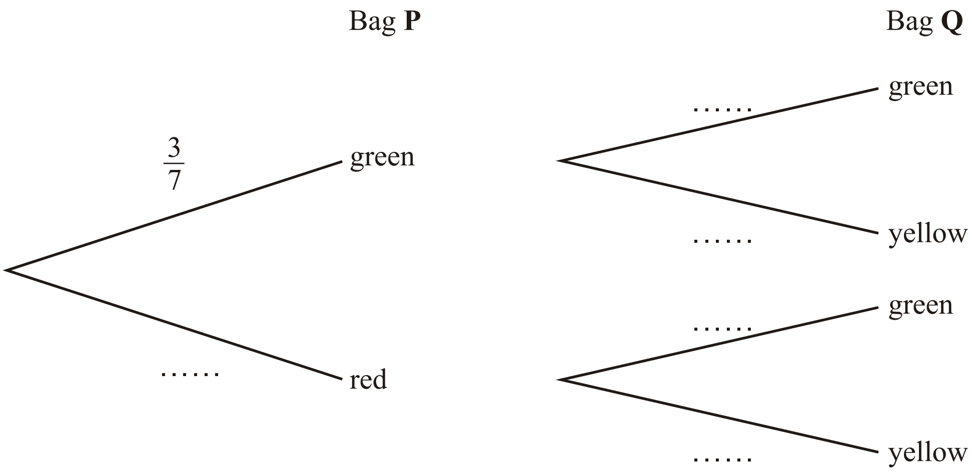


Bag **P** Bag **Q**

Bag **P** contains 3 green sweets and 4 red sweets.
Bag **Q** contains 1 green sweet and 3 yellow sweets.

Jacob takes one sweet at random from each bag.

(a) Complete the tree diagram.



(2)

(b) Calculate the probability that Jacob will take 2 green sweets.

……………………

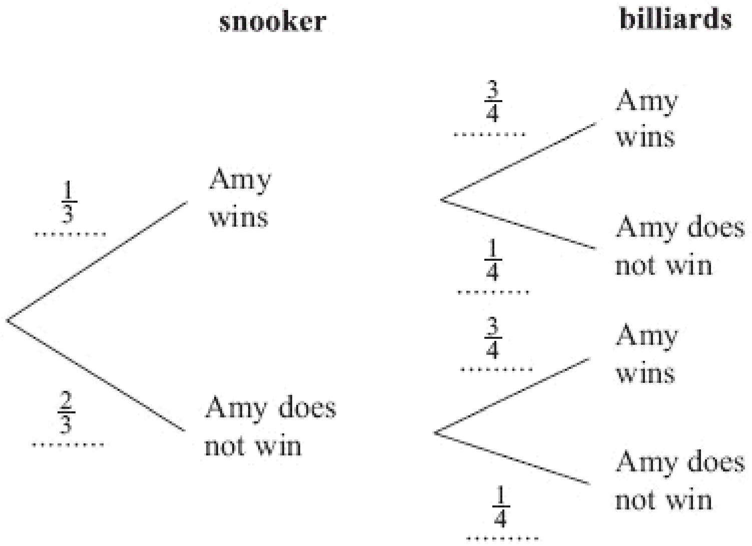
(2)
(Total 4 marks)

21. Amy is going to play one game of snooker and one game of billiards.

The probability that she will win the game of snooker is $\frac{1}{3}$

The probability that she will win the game of billiards is $\frac{3}{4}$

The probability tree diagram shows this information.



Amy played one game of snooker and one game of billiards on a number of Fridays.
She won at **both** snooker and billiards on 21 Fridays.

Work out an estimate for the number of Fridays on which Amy did not win either game.

....

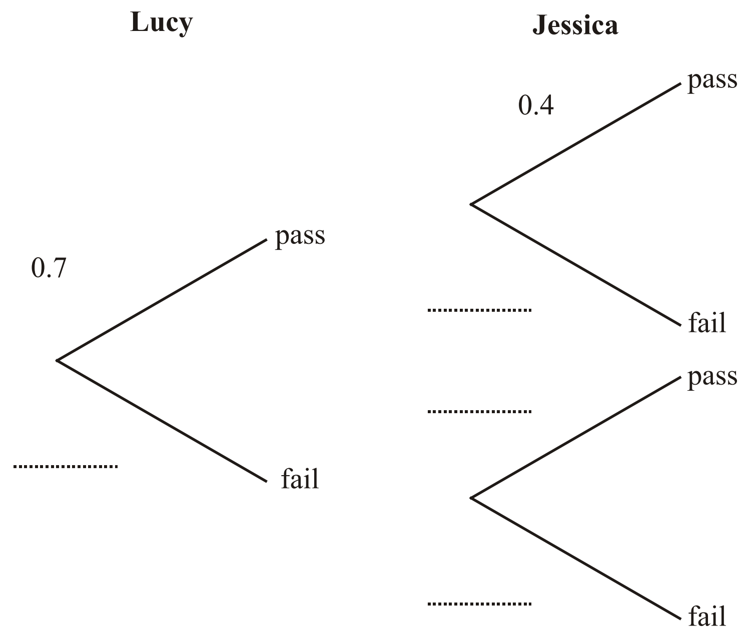
(Total 3 marks)

22. Lucy and Jessica take a test.

The probability that Lucy will pass the test is 0.7

The probability that Jessica will pass the test is 0.4

(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that only one of the 2 girls will pass the test.

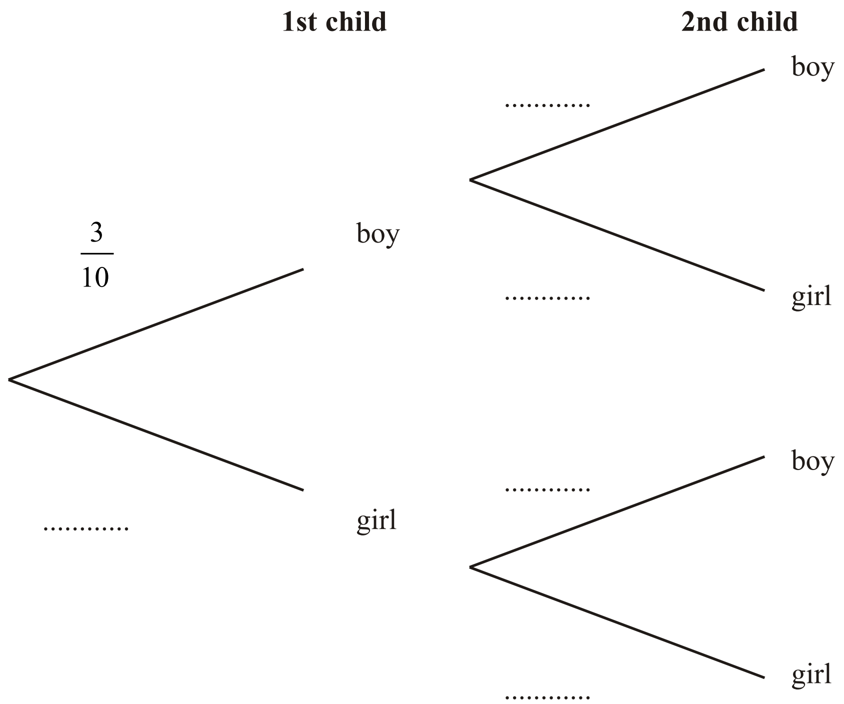
....

(3)

(Total 5 marks)

23. There are 3 boys and 7 girls at a playgroup.
Mrs Gold selects two children at random.

(a) Complete the probability tree diagram below.



(2)

(b) Work out the probability that Mrs Gold selects two girls.

....

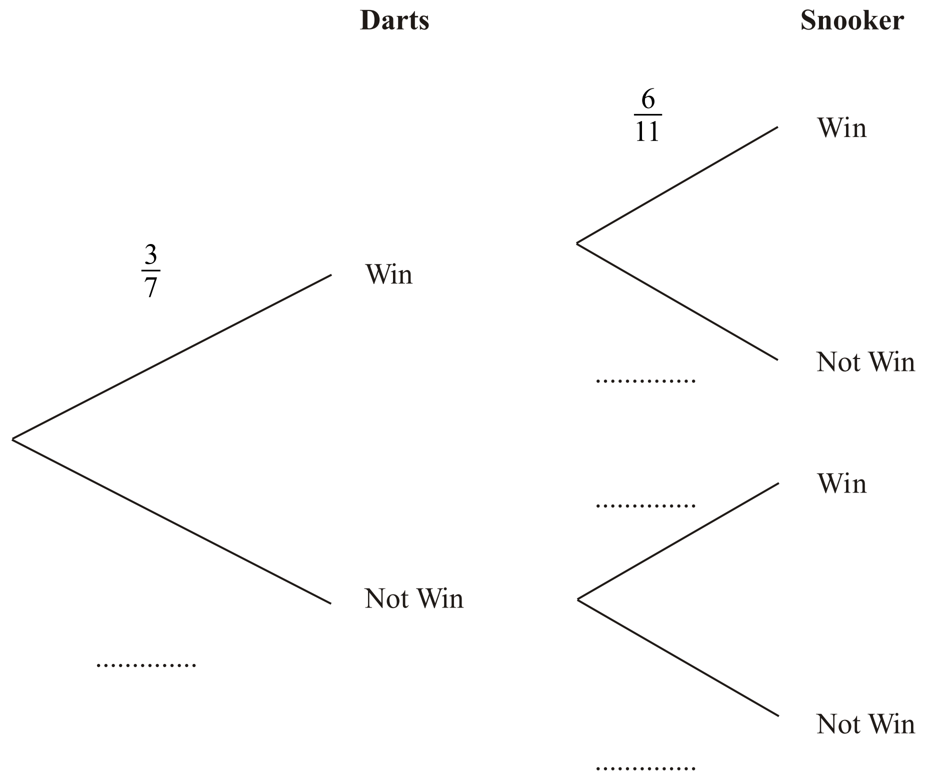
(2)
(Total 4 marks)

24. Ivan plays a game of darts and a game of snooker.

The probability that he will win at darts is $\frac{3}{7}$

The probability that he will win at snooker is $\frac{6}{11}$

Complete the probability tree diagram.



(Total 2 marks)

25. There are 3 strawberry yoghurts, 2 peach yoghurts and 4 cherry yoghurts in a fridge.

Kate takes a yoghurt at random from the fridge.
She eats the yoghurt.
She then takes a second yoghurt at random from the fridge.

Work out the probability that both the yoghurts were the same flavour.

....

(Total 4 marks)

26. Nicola is going to travel from Swindon to London by train.

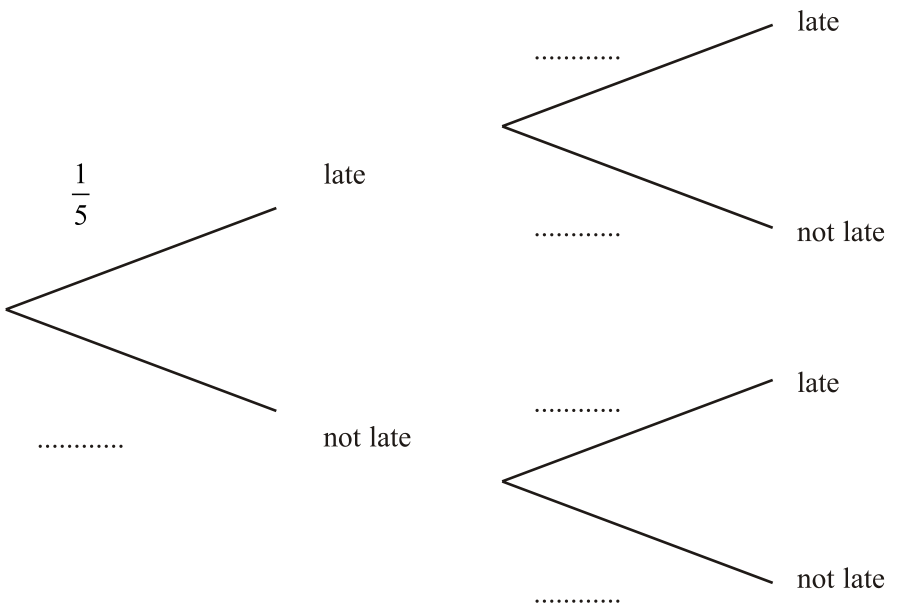
The probability that the train will be late leaving Swindon is $\frac{1}{5}$

If the train is late leaving Swindon, the probability that it will arrive late in London is $\frac{7}{10}$

If the train is **not** late leaving Swindon, the probability that it will arrive late in London is $\frac{1}{10}$

(a) Complete the probability tree diagram.

leaves Swindon **arrives in London**



(2)

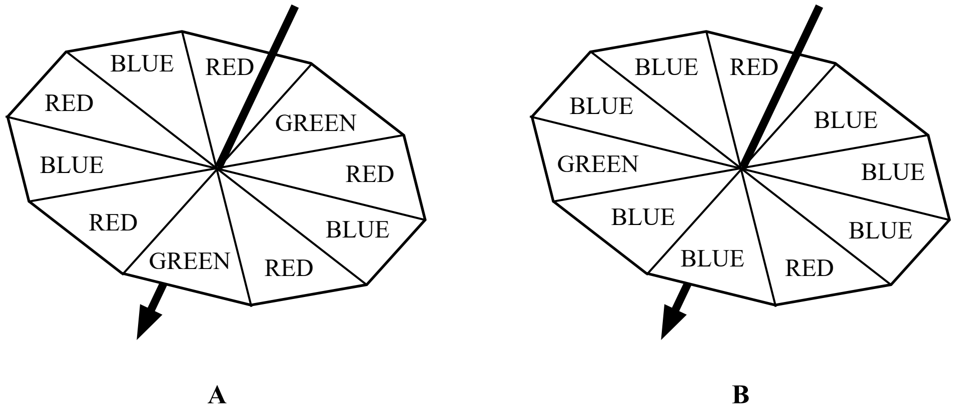
(b) Work out the probability that Nicola will arrive late in London.

....

(3)

(Total 5 marks)

27. William has two 10-sided spinners.
The spinners are equally likely to land on each of their sides.



Spinner **A** has 5 red sides, 3 blue sides and 2 green sides.
Spinner **B** has 2 red sides, 7 blue sides and 1 green side.

William spins spinner **A** once.
He then spins spinner **B** once.

Work out the probability that spinner **A** and spinner **B** do **not** land on the same colour.

....

(Total 4 marks)

28. There are 4 bottles of orange juice,
3 bottles of apple juice,
2 bottles of tomato juice.

Viv takes a bottle at random and drinks the juice.
Then Caroline takes a bottle at random and drinks the juice.

Work out the probability that they both take a bottle of the same type of juice.

....
(Total 4 marks)

01. (a) No, as you would expect about 100.
Yes, as it is possible to get 200 sixes with a fair dice 1
B1 for a consistent answer

(b) 3

$\frac{1}{6}, \frac{5}{6}$ + labels

B1 for $\frac{5}{6}$ *on the red dice, <u>not six</u> branch*
B1 for a fully complete tree diagram with all branches labelled
B1 for $\frac{1}{6}, \frac{5}{6}$ *on all remaining branches as appropriate*

[4]

02. (a) No, as you would expect about 100.
Yes, as it is possible to get 200 sixes with a fair dice — 1

B1 for a consistent answer

(b) — 3

$\frac{1}{6}, \frac{5}{6}$ + labels

B1 for $\frac{5}{6}$ on the red dice, <u>not six</u> branch

B1 for a fully complete tree diagram with all branches labelled

B1 for $\frac{1}{6}$ and $\frac{5}{6}$ on all remaining branches as appropriate

(c) (i) $\frac{1}{36}$ — 2

$\left(\frac{1}{6}\right)^2$

M1 $\left(\frac{1}{6}\right)^2$ or $\frac{1}{6} \times \frac{1}{6}$ only or 0.28

A1 $\frac{1}{36}$ or 0.03 or better

(ii) $\frac{11}{36}$ — 3

$1 - \left(\frac{5}{6}\right)^2$

OR

$\frac{1}{6} \times \frac{5}{6} + \frac{5}{6} \times \frac{1}{6} + \frac{1}{6} \times \frac{1}{6}$

M2 for $1 - \left(\frac{5}{6}\right)^2$ or $1 - \frac{5}{6} \times \frac{5}{6}$

A1 cao

OR

M1 for $\frac{1}{6} \times \frac{5}{6}$ oe

M1 for 2 or 3 only of $\frac{1}{6} \times \frac{5}{6}, \frac{5}{6} \times \frac{1}{6}$, "a"

A1 for $\frac{11}{36}$ or 0.31 or better

[9]

03. (a) 0.4, 0.6
0.4, 0.6,
0.4 — 2

B1 for LHS: (0.6), 0.4
B1 for RHS: 0.6, 0.4, 0.6, 0.4

(b) 38 — 3

$(30 \times 42) - (25 \times 42.8) = 1260 - 1070 = 190$
$190 \div 5 =$

M1 for (30 × 42) – (25 × 42.8) or 1260 – 1070 or 190 seen
M1 (dep) for "190" ÷ 5
A1 cao

[5]

04. (a) 0.4
0.6,0.4,
0.6,0.4 — 2

B1 for LHS: (0.6), 0.4
B1 for RHS: 0.6, 0.4, 0.6, 0.4

(b) 0.36 — 2

0.6×0.6

M1 0.6 × "0.6" [0 < "0.6" < 1]
A1 cao

(c) 38 — 3

$(30 \times 42) - (25 \times 42.8) = 1260 - 1070 = 190$
$190 \div 5 =$

M1 for (30 × 42) – (25 × 42.8) or 1260 – 1070 or 190 seen
M1(dep) for "190" ÷ 5
A1 cao 38

[7]

05. (a) 0.495 3

$0.55 \times 0.45 \times 2$

M1 for 0.55×0.45 or 0.55×0.3 or 0.55×0.15 seen
M1 (dep) for $0.55 \times 0.45 \times 2$ or adding 3 or 4 correct terms out of $0.55 \times 0.3 \times 2 + 0.55 \times 0.15 \times 2$
A1 cao

(b) 0.255 3

WL or LW or DD
0.55×0.15, 0.15×0.55, 0.3×0.3
$0.165 + 0.09$

M1 for 0.55×0.15 or 0.3×0.3
M1(dep) for adding 2 or 3 correct terms
A1cao

[6]

06. $\frac{1}{4}$ on LH branch

$\frac{2}{3}$ & $\frac{1}{3}$ & $\frac{2}{3}$ on RH branches 2

B1
B1

[2]

07. (a) $\frac{1}{4}$ on LH branch

$\frac{2}{3}$ & $\frac{1}{3}$ & $\frac{2}{3}$ on RH branches 2

B1 cao
B1

(b) $\frac{7}{12}$ 3

$\frac{3}{4} \times \frac{2}{3} + \frac{1}{4} \times \frac{1}{3} = \frac{6}{12} + \frac{1}{12}$

M1 for $\frac{3}{4} \times \frac{2}{3}$ or $\frac{1}{4} \times \frac{1}{3}$ from their tree diagram
M1 for sum of two products
A1 for $\frac{7}{12}$ oe

(c) 14 — 3

$n = 21 \times 4$ or $\frac{1}{6} : \frac{1}{4}$ oe

$\frac{1}{6} \times 84$ or $21 \times \frac{2}{3}$

M1 for either $\frac{1}{3} \times \frac{3}{4} \left(= \frac{1}{4}\right)$ *or* $\frac{2}{3} \times \frac{1}{4} \left(= \frac{1}{6}\right)$ *from their tree diagram*

M1 for 21×4 *(= 84) or* $\frac{21}{3} \times 2$

A1 for 14 cao

SC: B2 for 63 seen in fraction or ratio

[8]

08. $\frac{2}{5}, \frac{5}{7}, \frac{2}{7}, \frac{5}{7}$ — 2

B1 for $\frac{2}{5}$ *in the correct place*

B1 for $\frac{5}{7}, \frac{2}{7}, \frac{5}{7}$ *all in the correct place*

[2]

09. (a) $\frac{2}{5}, \frac{5}{7}, \frac{2}{7}, \frac{5}{7}$ — 2

B1 for $\frac{2}{5}$ *in the correct place*

B1 for $\frac{5}{7}, \frac{2}{7}, \frac{5}{7}$ *all in the correct places*

(b) $\frac{3}{5}\times\frac{5}{7}+\frac{2}{5}\times\frac{2}{7}$

$\frac{19}{35}$ 3

M1 for $\left(\frac{3}{5}\times'\frac{5}{7}'\right)$ ***or*** $\left('\frac{2}{5}'\times'\frac{2}{7}'\right)$

M1 (dep) for $\left(\frac{3}{5}\times'\frac{5}{7}'\right)+\left('\frac{2}{5}'\times'\frac{2}{7}'\right)$

A1 cao

[5]

10. $\frac{1}{4}$

$\frac{2}{3}$ $\frac{1}{3}$ $\frac{2}{3}$ 2

B1 for $\frac{1}{4}$ *correct on tennis*

B1 for $\frac{2}{3}, \frac{1}{3}, \frac{2}{3}$ *correct on snooker*

[2]

11. (a) $\frac{1}{4}$

$\frac{2}{3}$ $\frac{1}{3}$ $\frac{2}{3}$ 2

B1 for $\frac{1}{4}$ *correct on tennis*

B1 for $\frac{2}{3},\frac{1}{3},\frac{2}{3}$ *correct on snooker*

(b) $\frac{3}{4}\times\frac{1}{3}$

$\frac{1}{4}$ 2

M1 for $\frac{3}{4}\times\frac{1}{3}$

A1 for $\frac{1}{4}$ *oe*

(c) $\frac{3}{4}\times\frac{2}{3}+\frac{1}{4}\times\frac{1}{3}$

$\frac{1}{2}+\frac{1}{12}$

$\frac{7}{12}$ 3

M1 for $\frac{3}{4}\times''\left(\frac{2}{3}\right)''$ ***or*** $''\left(\frac{1}{4}\right)''\times''\left(\frac{1}{3}\right)''$

M1 $\frac{3}{4}\times''\left(\frac{2}{3}\right)''+''\left(\frac{1}{4}\right)''\times''\left(\frac{1}{3}\right)''$

A1 for $\frac{7}{12}$ *oe (0.58…)*

Or

M2 for $1-\left(\frac{3}{4}\times\frac{1}{3}+\frac{1}{4}\times\frac{2}{3}\right)$

A1 for $\frac{7}{12}$ *oe (0.58…)*

[7]

12. (a) 0.6 2

0.6, 0.4, 0.6

B1 for LHS: (0.4), 0.6

B1 for RHS: (0.4), 0.6, 0.4, 0.6

(b) 0.4 × 0.4 = 0.16 2

M1 for 0.4 × 0.4 or $\frac{4}{10}\times\frac{4}{10}$ *oe*

A1 for 0.16 or $\frac{4}{25}$ *or* $\frac{16}{100}$ *oe*

[4]

13. (a) 0.6 and 0.7, 0.3, 0.7 2

B1 for 0.6 on LH branch

B1 for 0.7, 0.3 and 0.7 on RH branches

(b) 0.4 × 0.3 = 0.12 2

M1 for 0.4 × 0.3

A1 0.12 oe

(c) 0.4 × 0.7 + 0.6 × 0.3 = 0.46 3

M1 for '0.4 × 0.7' or '0.6 × 0.3'
M1 for addition of two products from correct branches
A1 0.46 oe
Alternative
M2 for an attempt to evaluate 1 – (0.3 × 0.4 +'0.6 × 0.7')
A1 cao

[7]

14. (a) 0.2
0.58, 0.22 0.2 2

B1 0.2 on jazz on 1st set
B1 0.58, 0.22 0.2
repeated 3 times

(b) 0.2 × 0.2 = 0.04 2

M1 '0.2' × '0.2'
A1 cao

(c) 0.8 × 0.2 × 2 + 0.2 × 0.2

or

1 – 0.8 × 0.8 = 0.36 3

M1 (0.58+0.22) × '0.2'
M1 (0.58 + 0.22) × '0.2' × 2 + '0.2' × '0.2'
A1 0. 36 cao
or
M2 1 – (0.58 + 0.22)^2
A1 0.36 cao
Listing the outcomes for (c)
CJ 0.58 × '0.2' = 0. 116 *FJ 0.22 × '0.2' = 0.044*
JC '0.2'× 0.58 = 0.116 *JF '0.2' × 0.22 = 0.044*
JJ '0.2' × '0.2' = 0.04
M2 for all 5 terms added
(M1 for any 2, 3 or 4 terms added)

[7]

15. (a) 0.2 and 0.4, 0.4 2

B1 for 0.2 oe on LH branch
B1 for 0.4 oe on both RH branches

(b) 0.8×0.6
0.48 — 2

M1 for 0.8 × 0.6 oe
A1 for 0.48 oe

(c) $0.8 \times 0.4 + 0.2 \times 0.6$
0.44 — 3

M1 for 0.8 × '0.4' or '0.2' × 0.6 oe
M1 for 0.8 × '0.4' + '0.2' × 0.6 oe
A1 for 0.44 oe
OR
M1 for '0.2' × '0.4' oe
M1 for 1 – ('0.8 × 0.6' + '0.2' × '0.4') oe
A1 for 0.44 oe

[7]

16. (a) $\frac{5}{8}$

$\frac{5}{8}, \frac{3}{8}, \frac{5}{8}$ — 2

B1 for $\frac{5}{8}$ correct for 1st counter
B1 for $\frac{5}{8}, \frac{3}{8}, \frac{5}{8}$ correct for 2nd counter

(b) $\frac{3}{8} \times \frac{3}{8}$

$\frac{9}{64}$ oe — 2

M1 for $\frac{3}{8} \times \frac{3}{8}$
A1 for $\frac{9}{64}$ oe

[4]

17. (a) Correct diagram — 2

B1 for 0.2 oe seen on bottom left branc
B1 for correct probabilities on other branches

(b) prob(WW) = 0.5 × 0.5
0.25 2

M1for 0.5 × '0.5'
A1ft for 0.25 oe

[4]

18. (a) 0.8,
0.4, 0.6, 0.4 2

B1 for Julie correct
B1 for Pat correct

(b) 0.12 oe 2

0.2 × 0.6

M1 for 0.2 × 0.6
A1 cao

[4]

19. (a) 0.7, 0.7, 0.3, 0.7 2

B1 for Monday correct
B1 for Tuesday correct

(b) 0.51 oe 3

1 – 0.7 × 0.7

M1 for 0.7 × 0.7
M1 for 1 – "0.49"
A1 for 0.51 oe

(M1 for 0. 3 × 0. 3 ***OR*** *0.7 × 0.3* ***OR*** *0.3 × 0.7*
M1 for 0. 3 × 0. 3 + 0.7 × 0. 3 + 0. 3 × 0.7
A1 for 0.51 oe)

[5]

20. (a) 5 fractions 2

$\frac{4}{7}$ and $\frac{1}{4}$, $\frac{3}{4}$, $\frac{1}{4}$, $\frac{3}{4}$

B1 for bag P correct
B1 for bag Q correct

(b) $\frac{3}{28}$ oe 2

$\frac{3}{7} \times \frac{1}{4}$

M1 for $\frac{3}{7} \times$ "$\frac{1}{4}$" *(0 < 2nd fraction < 1)*
A1

[4]

21. 14 3

$n = 21 \times 4$ or $\frac{1}{4} : \frac{1}{6}$

$\frac{1}{6} \times 84$ or $21 \times \frac{2}{3}$

M1 for $\frac{1}{3} \times \frac{3}{4}\left(= \frac{1}{4}\right)$ *or* $\frac{2}{3} \times \frac{1}{4}\left(= \frac{1}{6}\right)$

M1 for $21 \times 4 = 84$ *or* $\frac{21}{3} \times 2$

A1 cao
[SC:B2 for answer of 63]

[3]

22. (a) 0.6
0.3 0.4
0.6 2

B1 for 0.3
B1 for 0.6, 0.4, 0.6

(b) (0.7 × 0.6) + (0.3 × 0.4)
0.54oe 3

M1 for either 0.7 × "0.6" or "0.3" × "0.4"
M1(dep) for (0.7 × "0.6") + ("0.3" × "0.4")
A1 cao

[5]

23. (a) 7/10 2/9, 7/9 3/9, 6/9 2

B2 for all 5 correct
(B1 for 2, 3, or 4 correct)

(b) $\frac{42}{90}$ 2

M1 for "1st girl" × "2nd girl"
A1 cao.

[4]

24. 4/7
5/11, 6/11, 5/11 2

B2 for all four probabilities correct
(B1for 1 probability correct)

[2]

25. $\left(\frac{3}{9}\times\frac{2}{8}\right)+\left(\frac{2}{9}\times\frac{1}{8}\right)+\left(\frac{4}{9}\times\frac{3}{8}\right)$

$=\frac{6+2+12}{72}$

$\frac{20}{72}$ 4

B1 for $\frac{2}{8}$ or $\frac{1}{8}$ or $\frac{3}{8}$ seen as 2^{nd} probability

M1 for $\left(\frac{3}{9}\times\frac{2}{8}\right)$ or $\left(\frac{2}{9}\times\frac{1}{8}\right)$ or $\left(\frac{4}{9}\times\frac{3}{8}\right)$

M1 for $\left(\frac{3}{9}\times\frac{2}{8}\right)+\left(\frac{2}{9}\times\frac{1}{8}\right)+\left(\frac{4}{9}\times\frac{3}{8}\right)$

A1 for $\frac{20}{72}$ o.e.

Alternative scheme for replacement

B0 for $\frac{3}{9}$ or $\frac{2}{9}$ or $\frac{4}{9}$ seen as 2^{nd} probability

M1 for $\left(\frac{3}{9}\times\frac{3}{9}\right)$ or $\left(\frac{2}{9}\times\frac{2}{9}\right)$ or $\left(\frac{4}{9}\times\frac{4}{9}\right)$

M1 for $\left(\frac{3}{9}\times\frac{3}{9}\right)+\left(\frac{2}{9}\times\frac{2}{9}\right)+\left(\frac{4}{9}\times\frac{4}{9}\right)$

A0 for $\frac{29}{81}$

Special cases

S.C award B2 for $\frac{29}{81}$ or $\frac{20}{81}$ or $\frac{29}{72}$

SC award B1 for $\frac{2}{9}$ and $\frac{1}{9}$ and $\frac{3}{9}$ or $\frac{3}{8}$ and $\frac{2}{8}$ and $\frac{4}{8}$ seen as second probability if B2 not scored

Watch for candidates who misread the question and work with 10ths and 9ths They can score M2

Any other total for the number of yoghurts must be identified before ft

[4]

26. (a) 4/5

(7/10, 3/10) (1/10, 9/10) 2

B2 cao

(B1 for 2 correct from 4/5, (7/10, 3/10), (1/10, 9/10))

(b) (1/5 × 7/10) + (4/5 × 1/10)
11/50 3

M1 for 1/5 × "7/10" or "4/5" × "1/10" oe selected
M1 for (1/5 × 7/10) + (4/5 × 1/10) oe
A1 for 11/50 oe

[5]

27. $\left(\frac{5}{10}\times\frac{7}{10}\right)+\left(\frac{5}{10}\times\frac{1}{10}\right)+\left(\frac{3}{10}\times\frac{2}{10}\right)+\left(\frac{3}{10}\times\frac{1}{10}\right)+\left(\frac{2}{10}\times\frac{2}{10}\right)+\left(\frac{2}{10}\times\frac{7}{10}\right)$

$= \frac{35+5+6+3+4+14}{100}$

OR

$1-\left[\left(\frac{5}{10}\times\frac{2}{10}\right)+\left(\frac{3}{10}\times\frac{7}{10}\right)+\left(\frac{2}{10}\times\frac{1}{10}\right)\right]$

$= 1-\frac{10+21+2}{100}=1-\frac{33}{100}$

$\frac{67}{100}$ 4

M1 for a tree diagram with at most 2 errors
or one of $\left(\frac{5}{10}\times\frac{7}{10}\right)$ *or* $\left(\frac{5}{10}\times\frac{1}{10}\right)$ *etc*

M1 for 5 out of 6 correct pairings of different colours
or 2 out of 3 correct pairings of same colours
or 8 out of 9 correct pairings of all colours

M1 (dep on M2) for adding 5 or 6 correct pairings of different colours
or 1 – (2 or 3 correct pairings of same colours)

A1 for $\frac{67}{100}$ *oe*

***SC** All correctly done but 2nd spinner all* $\frac{x}{9}$

Award M1 for a "correct tree"
M1 for adding 5 or 6 "correct pairings" of different colours or 1 – (2 or 3 "correct pairings" of same colours)
M0 A0 (answer = 67/90)

[4]

28. $\left(\frac{4}{9}\times\frac{3}{8}\right)+\left(\frac{3}{9}\times\frac{2}{8}\right)+\left(\frac{2}{9}\times\frac{1}{8}\right) = \frac{12+6+2}{72}$

$\frac{20}{72}$ oe 4

B1 for $\frac{3}{8}$ *or* $\frac{2}{8}$ *or* $\frac{1}{8}$ *seen as* 2^{nd} *probability*

M1 for $\left(\frac{4}{9}\times\frac{3}{8}\right)$ *or* $\left(\frac{3}{9}\times\frac{2}{8}\right)$ *or* $\left(\frac{2}{9}\times\frac{1}{8}\right)$

M1 for $\left(\frac{4}{9}\times\frac{3}{8}\right)+\left(\frac{3}{9}\times\frac{2}{8}\right)+\left(\frac{2}{9}\times\frac{1}{8}\right)$

A1 for $\frac{20}{72}$ *oe*

Alternative scheme for replacement

B0 for $\frac{4}{9}$ *or* $\frac{3}{9}$ *or* $\frac{2}{9}$ *seen as* 2^{nd} *probability*

M1 for $\left(\frac{4}{9}\times\frac{4}{9}\right)$ *or* $\left(\frac{3}{9}\times\frac{3}{9}\right)$ *or* $\left(\frac{2}{9}\times\frac{2}{9}\right)$

M1 for $\left(\frac{4}{9}\times\frac{4}{9}\right)+\left(\frac{3}{9}\times\frac{3}{9}\right)+\left(\frac{2}{9}\times\frac{2}{9}\right)$

A0 for $\frac{29}{81}$

Special cases

S.C. if M0 scored, award B2 for $\frac{29}{81}$ *or* $\frac{20}{81}$ *or* $\frac{29}{72}$

S.C. if M0 scored award B1 for $\frac{3}{9}$ *or* $\frac{2}{9}$ *or* $\frac{1}{9}$

or $\frac{3}{8}$ *and* $\frac{2}{8}$ *and* $\frac{4}{8}$ *as second probability if B2 not scored*

[4]

01. Mathematics A Paper 4

Part (a) was answered well by candidates of all abilities. Acceptable explanations often mentioned 100 as the expected number of sixes. The first mark in part (b) for writing $\frac{5}{6}$ on the "Not Six" branch was gained by many candidates but the tree diagram was often not completed correctly. Candidates commonly forgot labels, gave incorrect probabilities, or added only one more branch to the diagram.

Mathematics B Paper 17

Candidates of all abilities managed to gain credit in part (a) for a reasonable explanation of the problem. This was well answered. Candidates who failed to score usually offered a contradictory explanation.
A completely correct tree diagram in part (b) was rare. Most attempts had one branch only from each of the two given branches. 5/6 was often seen as the probability for the red dice not showing a six, and this was often the only mark gained.

02. Part (a) required candidates to comment on a statement about a probability. Most thought that the dice was unfair, maintaining that they would have expected 100 sixes. A few used the phrase ‘about 100 sixes’. Some did say that the dice was fair, because it is possible to get 200 out of 600 sixes from a fair dice.
Part (b) required candidates to complete a probability tree diagram. Most did so by drawing two more sets of two branches, correctly labelling and getting full marks. A few candidates thought that they should just draw 2 out of 4 branches. A few candidates drew the 4 branches but the probabilities on pairs of branches did not add up to 1.
Part (c) was a standard task and was well done by many candidates. The main error of good candidates was in (ii) where they interpreted the task as finding exactly one six. However, there were a sizeable number who thought that
$1 \times 1 = 2$ when multiplying the fractions together.

03. This was truly a question of “two halves”. Part (a) was well answered. Nearly all candidates correctly gave the 0.4 on the left hand branch, and the majority went on to gain the second mark, but is was disappointing to find many errors on the right hand side, including careless reversals of the 0.6 and 0.4, or an apparent desire to make all four probabilities sum to 1. In Part (b) few gained any marks; there was little understanding of what the calculation of the mean involves.

04. Mathematics A Paper 6

Parts (a) and (b) were well answered. There were a few candidates who thought the question was about sampling without replacement.
Part (c) proved to be more of a challenge, with many candidates failing to appreciate that the key idea involved find the total time for the original 30 CDs and subtracting the total time for the 5 CDs.

Mathematics B

Paper 17

All but a minority gained one mark in part (a), usually for a correct probability on the first branch of the tree diagram.
In part (b) only very few were able to gain any marks, usually 3 or nothing.

Paper 19

Part (a) was well done although some candidates did write the product of two probabilities for the second choice rather than the probability. The majority of candidates successfully answered part (b). A common error here was to add rather than multiply the two probabilities. Part (c) was very poorly done with the majority of candidates having no real idea how to tackle the question. The common incorrect approach was to calculate the difference between the mean playing times and subtract this from the mean playing time of all the CDs.

05. This was an unstructured probability question. In the first part candidates had to realise that they had to use the probability of a 'not win' to get 0.55×0.45. This then has to be multiplied by 2 and evaluated. Some candidates drew a tree diagram and were able to add together 4 terms to get the correct answer of 0.495.
In the second part, candidates had to realise that there were three possible cases to consider. These were 'win, lose', 'lose, win' and 'draw, draw' over the two games. Many candidates were able to identify at least one of these terms but the overall success rate was not high.
Weaker candidates assumed that all possible cases were equally likely.

06. **Specification A**

A well answered question. The only common error was to use quarters on the right hand branches.

Specification B

¼ was often seen in the first pair of branches, gaining one mark, however there were many confused attempts at completing the second pairs of branches, often still using quarters.

07. Part (a) was generally done well.
In part (b), many candidates knew that they had to multiply and then add the probabilities, but only about half were able to do this accurately. A common error was $\frac{1}{4} \times \frac{1}{3} = \frac{2}{12}$.
Candidates generally found part (c) of this question difficult. Only the best candidates were able to achieve all the mark, though there were many that achieved at least one mark- usually for writing $\frac{3}{4} \times \frac{1}{3}$. Common answers were 63 and 84- which were awarded two marks.

08. This question was usually well answered. Common misunderstandings included a reversal of the 2/7 and 5/7 on the bottom two branches, or a failure to use 7 in the denominator.

09. Most candidates inserted the correct fractions into the probability tree diagram. Part (b) was also well answered with the correct answer of $\frac{19}{35}$ often seen. Common occurring errors included a correct method, but with the multiplication carried out wrongly by making the denominators of the fractions the same, followed by incorrect multiplication. A few candidates thought that they had to add the fractions. They scored no marks.

10. **Specification A**

The tree diagram was completed correctly by more than half of the candidates. It was not surprising that most errors were made on the bottom two right hand branches.

Specification B

Most candidates scored at least one mark here, usually for correctly labelling the $\frac{1}{4}$ in the first branch. Failure in the second branches often arose from including quarters in one or more of the probabilities.

11. **Specification A**

The probability tree diagram was generally completed correctly. Part (b) was almost always answered using a correct method although there were the occasional errors of $\frac{3}{4} \times \frac{1}{3} = \frac{4}{12}$.
Answers to part (c) were also good, but less successful than part (b). There were the usual errors of confusing the use of multiplication and addition in the method as well as the accuracy errors of the type outlined for part (b).

Specification B

The tree diagram in part (a) was completed correctly by over 90% of candidates. Parts (b) and (c) were generally well answered although more candidates than usual attempted to add rather than multiply the relevant probabilities. A few candidates indicated that they knew that the relevant probabilities in (a) needed to be multiplied but then went on to add them regardless.

12. The majority of candidates were able to complete the tree diagram in part (a). In part (b), most candidates knew that they were required to multiply 0.4 by 0.4 but a large proportion of these had problems in doing this- typically giving their answer as 1.6 or 0.8. Relatively few added the probabilities.

13. Part (a) of this question was done well by the majority of candidates, scoring at least one mark for 0.6 on the first branch.

In parts (b) and (c), candidates often identified the correct probabilities, but a significant number were confused about that operations they should be using. A popular error was to add the probabilities along the branches instead of multiplying them. A surprising number of those candidates who multiplied probabilities were unable to do this correctly, e.g. 0.3 × 0.4 was often evaluated as 1.2. In part (c), many candidates worked with the correct two pairs of branches, but many of these were confused about the order of the operations; a common incorrect method was (0.6 + 0.7) × (0.6 + 0.3). A popular incorrect answer was 4.6

As the question was written in decimals most candidates kept the probabilities in this form, it was noted, however, that those candidates who converted their decimals to fractions were often more accurate with their answers than those that hadn't.

14. Part (a) was well answered. Very few candidates thought that this was sampling without replacement.

Answers to part (b) were split between the correct 0.2 × 0.2 and the incorrect 0.2 + 0.2, although some candidates evaluated the former as 0.4

Answers to part (c) generally considered some of the 5 cases. Quite often the answer 0.2 was seen from 0.58 × 0.2 + 0.22 × 0.2 + 0.2 × 0.2 or the answer 0.32 from (0.58 × 0.2 + 0.2) × 2

The approach 1 – P(No jazz) was rarely seen, but usually led to the correct answer.

15. Part (a) was done well by the vast majority of the candidates. In part (b), many candidates knew that they needed to multiply the probabilities but a significant number of these were unable to do the calculation accurately, e.g. 0.8 × 0.6 = 4.8 or 0.42. Common incorrect methods were 0.8 + 0.6 = 1.4 and $\frac{0.8+0.6}{2} = 0.7$. In part (c), only the best candidates were able to score full marks for this question, but many were able to score 1 mark for either 0.8 × 0.4 or 0.2 × 0.6. Common errors here were similar to those in part (b), e.g. those involving poor arithmetic, e.g. 0.8 × 0.4 = 3.2, 0.24 or 2.4, or those involving confusion as to when to multiply the probabilities or when to add the probabilities, e.g. (0.8 + 0.4) × (0.2 + 0.6).

16. Accurate completion of the probability tree diagram was good with most candidates scoring at least one mark. In part (b) however a great many candidates added the probabilities instead of multiplying. It is also of note that of the candidates who correctly quoted $\frac{3}{8} \times \frac{3}{8}$ a significant number failed to correctly work out this product; $\frac{9}{16}$ being a common error.

17. Very few candidates failed to score any marks at all in this question.

Part (a) was answered very well with most candidates completing the probability tree diagram correctly. Errors usually occurred on the right hand branches where some candidates put the values 0.5, 0.3 and 0.2 in the wrong order and some inserted the results of multiplying two probabilities together. A significant number of candidates were not aware that they needed to multiply the probabilities on the relevant branches in part (b) and many added 0.5 to 0.5 instead. Even when candidates did write down 0.5 × 0.5 this was sometimes evaluated incorrectly with answers of 0.5, 1 and even 2.5 seen quite frequently. Some candidates with incorrect answers lost the opportunity of gaining a method mark here because they did not show any working.

18. Part (a) was generally well done. However, a number failed to get the correct entries for Pat. Part (b) could be done independently of the probability tree diagram. Many candidates wrote down the correct expression of 0.2 × 0.6 and obtained the answer 0.12. However, a significant number of candidates gave an answer of 1.2. The incorrect method of 0.2 + 0.6 was frequently seen.

19. Part (a) was well answered. In part (b) the majority of candidates found one product correctly but few were able to demonstrate a fully correct method often failing to appreciate the mathematical meaning of 'at least'. It is disappointing to report that many could not correctly find the value of the individual products and some final answers were even greater than one.

20. Completion of the tree diagram was well done by the vast majority of candidates. In part (b) a significant number of candidates added rather than multiplied the probabilities. The main concern, however, was candidates' failure to always evaluate the fraction product correctly. It is worth noting that section B is a calculator section and so the product should not have been a problem. A common error was $\frac{3}{7} \times \frac{1}{4} = \frac{4}{28} = \frac{1}{7}$ or, perhaps worse in a probability question, $\frac{3}{7} \times \frac{1}{4} = \frac{12}{28} \times \frac{7}{28} = \frac{84}{28} = 3$

21. Over 60% of candidates used the probabilities on the tree diagram correctly and indicated that they would multiply appropriate probabilities. Unfortunately, many arithmetic errors were then seen; a significant number of candidates added rather than multiplied the probabilities. A common error was to give the answer as 63 coming from subtracting the number of times both games were won from the total number of games played.

22. Part (a) was answered correctly by the majority of candidates. Candidates generally had much less success with part (b) which was poorly done. A significant number of candidates added the probabilities and then averaged these. Another incorrect method was to find the two correct products but then multiple these instead of adding them.

23. Candidates clearly understood the concept of a tree diagram and there were many fully correct answers to this question. A significant minority of candidates however, did not recognise this as a "non-replacement" situation and marked the same probabilities ($\frac{3}{10}, \frac{7}{10}$) on the second stage of their diagram. Although these candidates were unable to gain any marks for at least two correct probabilities in part (a), many used their probabilities correctly in part (b) to gain some credit in that part of the question. In part (b) some candidates failed to identify the need to multiply two probabilities and disappointingly, a significant number attempted to add the probabilities, sometimes giving numbers greater than one as their answers. $\frac{13}{19}$ was often seen following $\frac{7}{10} + \frac{6}{9}$. A number of candidates misread the question and gave the probability of at least one girl. Candidates who worked out the correct answer ($\frac{42}{90}$) but failed to simplify their fraction correctly were not penalised as the question was not testing this skill. This does however confirm the need for candidates to show their method clearly in the space for working. The need to show working was also highlighted by those candidates who knew they had to multiply, and wrote this down, but had insufficient ability with fractions to complete this correctly and those who could not correctly multiply 6 by 7.

24. This question was well understood but it was surprising to see so many candidates making errors in labelling the probabilities for snooker. The Darts "Not win" was almost correctly labelled by 96% of candidates but they often switched the probabilities for "win" and "not win" for snooker.

25. This was a fairly standard, but non-trivial, probability question. Many successful candidates drew correct probability tree diagrams and used them properly. 24% of candidates knew that they had to multiply the probabilities together as they worked along a set of branches starting with the root and were then able to add the resulting 3 fractions correctly to get the right answer. However, there were a large number of errors due to inability to tackle the arithmetic of fractions correctly. These were of the following general types:

- carelessness, exemplified by one of $\frac{3}{9}\times\frac{2}{8}=\frac{5}{72}$ or $\frac{2}{9}\times\frac{1}{8}=\frac{3}{72}$
- confusion over multiplication, exemplified by all of $\frac{3}{9}\times\frac{2}{8}=\frac{5}{72}$,
  $\frac{2}{9}\times\frac{1}{8}=\frac{3}{72}$ and $\frac{4}{9}\times\frac{3}{8}=\frac{7}{72}$
- confusion over multiplication as exemplified by $\frac{3}{9}\times\frac{2}{8}=\frac{42}{72}$ or $\frac{3}{9}\times\frac{2}{8}=\frac{432}{72}$
- confusion over addition as exemplified by $\frac{6}{72}+\frac{2}{72}+\frac{12}{72}=\frac{20}{216}$

Many candidates made life harder for themselves by calculating the correct fractions for the cases SS, PP and CC, cancelling them and then making an error on the addition of the three fractions with different denominators.

Some candidates treated the problem as one of replacement and were rewarded as they had essentially the correct method.

Some candidates thought the total of yoghurts was 8 rather than 9 and ended up with a fraction over 56 and there were also some candidates who tried to eat 3 yoghurts.

Other candidates gave fractions such as prob. (2nd is S) = $\frac{2}{9}$ rather than $\frac{2}{8}$.

Some candidates drew out the whole equally likely sample space for the case with replacement and obtained the answer $\frac{29}{81}$

There were, of course many candidates who tried to draw a probability tree but could not get its structure correct (generally they did not have 3 branches from every node) and many others who could not get as far as that. 45% of candidates scored no marks.

26. A considerable number of candidates were able to score full marks on this question.

Most candidates were able to score at least 1 mark in part (a). Common incorrect answers here include reversing the positions of 1/10 and 9/10 on the bottom right hand branches of the tree diagram, and giving both pairs of branches on the right hand side of the tree diagram as the same fractions (usually 7/10 and 3/10).

In part (c), the many candidates were able to write down 1/5 × 7/10 for one of the ways that Nicola could be late, but neglected to consider the other way (i.e. 4/5 × 1/10). Other common errors were based on a confusion in the required processes, e.g. $\left(\frac{1}{5}\times\frac{7}{10}\right)+\left(\frac{4}{5}\times\frac{1}{10}\right)$; or in a misunderstanding of how to interpret a tree diagram, e.g. $\frac{7}{10}\times\frac{1}{10}$. Examiners reported a general weakness in the candidates' ability to deal with fractions.

27. There were some excellent answers to this question in which a correctly drawn probability tree was constructed carrying the correct probabilities on each branch. The six required probability products were then identified leading to the final probability of 67/100. Over 20% of the candidates got this question fully correct with a further 6% only making one slip. The alternative methods being used in an attempt to arrive at the final answer did, however, seemed to be less successful. An abundance of fractions in the subsequent working very often left the student wondering how to combine them together into one single probability. There was some evidence of non-replacement seen thus making the question much more difficult than it need have been.

The fractions manipulation within the working is clearly an area of weakness as some found difficulty in combining fractions together. For example 5/10 × 7/10 ended up as 35/20, 12/100, and any other combination of the four numbers. Cancelling the fractions down before multiplying 5/10 × 7/10 = ½ × 7/10 = 7/20 was fine but then presented a problem when they had to add together fractions with different denominators. As a general rule it would be easier to achieve the final result if the fractions are not cancelled down. 60% of the candidates failed to score any marks on this question. Many had little idea what to do, though realising it involved the fractions 1/10; 2/10; 7/10 etc, then writing down some simple combination of these fractions, including multiplying 3 together, adding or taking away. Others had a separate tree diagram for each spinner, showing one or two throws but were then not sure what to do with their answers. Candidates using decimal notation also demonstrated correct tree diagrams but many had difficulty multiplying e.g. 0.2 × 0.2 correctly (the usual answer being 0.4).

28. This was a fairly standard, but non-trivial, probability question. Many successful candidates drew correct probability tree diagrams and used them properly. 21% of candidates knew that they had to multiply the probabilities together as they worked along a set of branches starting with the root and a further 36% of candidates knew they had to be to add the resulting 3 fractions to get the right answer. However, there were a large number of errors due to inability to tackle the arithmetic of fractions correctly. These were of the following general types:

- carelessness, exemplified by one of $\frac{3}{9}\times\frac{2}{8}=\frac{5}{72}$ or $\frac{2}{9}\times\frac{1}{8}=\frac{3}{72}$
- confusion over multiplication, exemplified by all of $\frac{4}{9}\times\frac{3}{8}=\frac{7}{72}$, $\frac{3}{9}\times\frac{2}{8}=\frac{5}{72}$ and $\frac{2}{9}\times\frac{1}{8}=\frac{3}{72}$
- confusion over multiplication as exemplified by $\frac{3}{9}\times\frac{2}{8}=\frac{42}{72}$ or $\frac{3}{9}\times\frac{2}{8}=\frac{432}{72}$
- confusion over addition as exemplified by $\frac{6}{72}+\frac{2}{72}+\frac{12}{72}=\frac{20}{216}$

Many candidates made life harder for themselves by calculating the correct fractions for the cases OO, AA and TT, cancelling them and then making an error on the addition of the three fractions with different denominators.

Some candidates treated the problem as one of replacement and were rewarded as they had essentially the correct method.

Some candidates thought the total of bottles was 8 or 10 rather than 9 and ended up with a fraction over 56 or 90 and there were also some candidates who tried to drink 3 bottles or convert to decimals.

Other candidates gave fractions such as probability(2nd is O) = $\frac{2}{9}$ rather than $\frac{2}{8}$.

Some candidates drew out the whole equally likely sample space for the case with replacement and obtained the answer $\frac{29}{81}$

There were, of course many candidates who tried to draw a probability tree but could not get its structure correct (generally they did not have 3 branches from every node) and many others who could not get as far as that.

It was pleasing however to see that fully correct solutions were given in 30% of cases though 44% of candidates scored no marks.