FULL MODEL ANSWERS

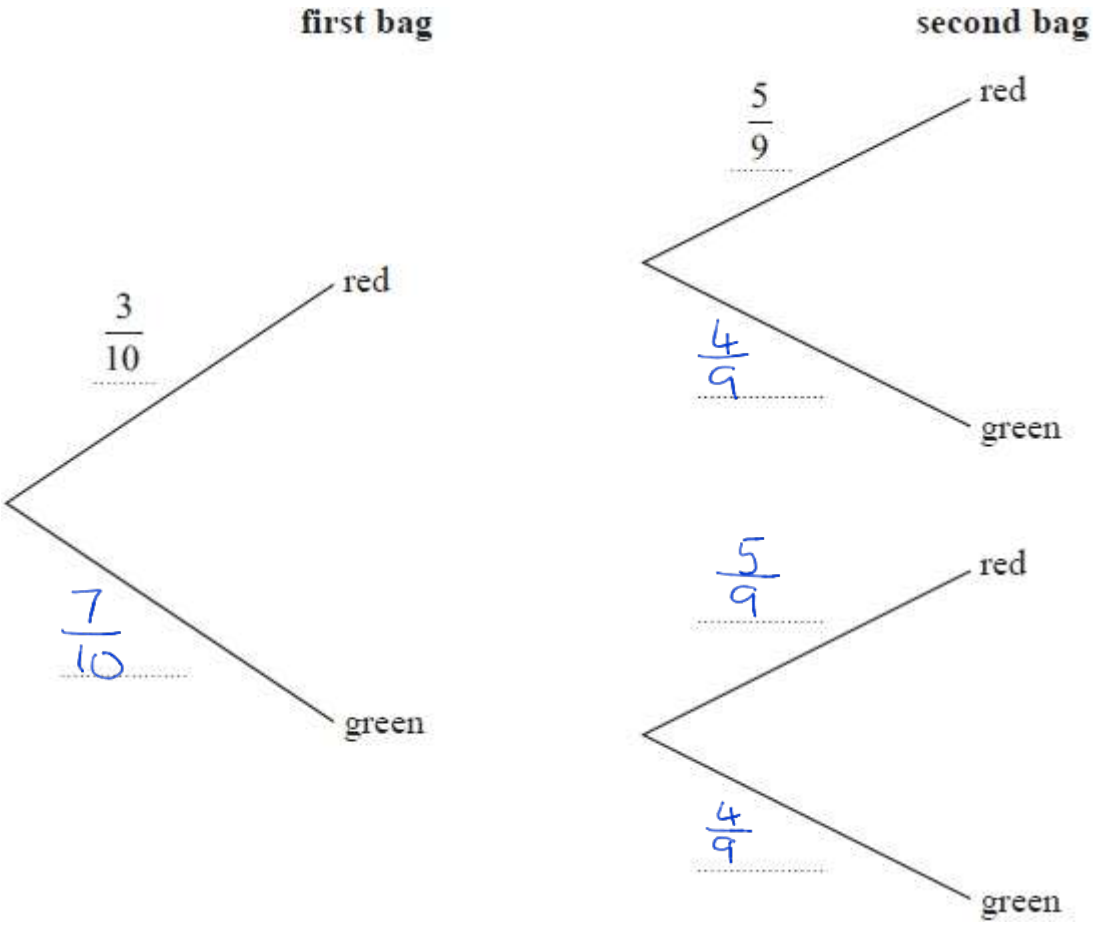
Q1. NON-CALCULATOR

Amina has two bags.

In the first bag there are 3 red balls and 7 green balls.
In the second bag there are 5 red balls and 4 green balls.

Amina takes at random a ball from the first bag.
She then takes at random a ball from the second bag.

(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that Amina takes two red balls.

$P(\text{Red AND Red}) = P(\text{Red}) \times P(\text{Red})$

$= \frac{3}{10} \times \frac{5}{9}$

$= \frac{15}{90}$

$\frac{1}{6}$

(2)

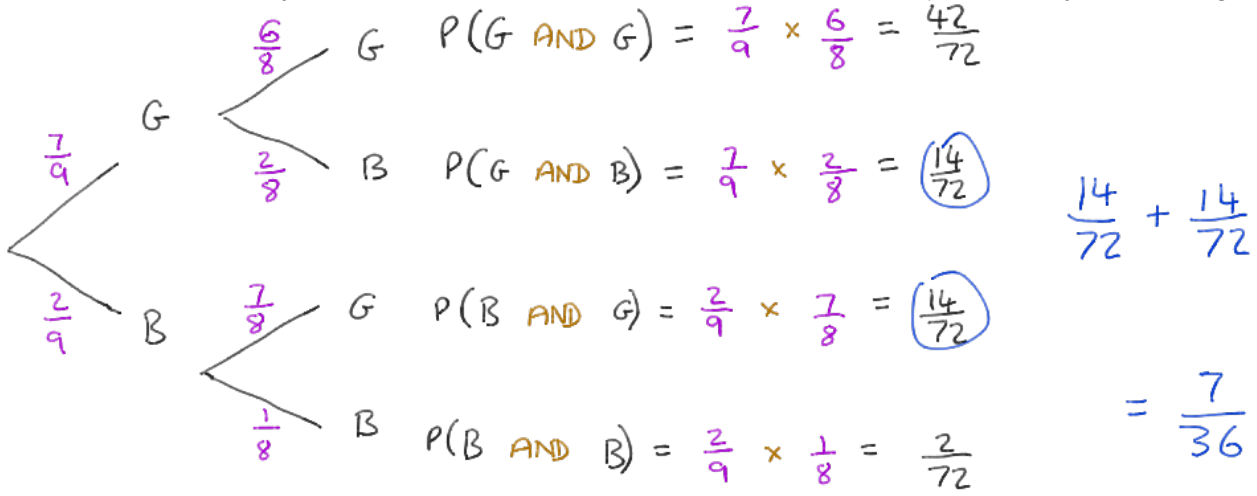
(Total for question = 4 marks)

Q2. NON-CALCULATOR

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.



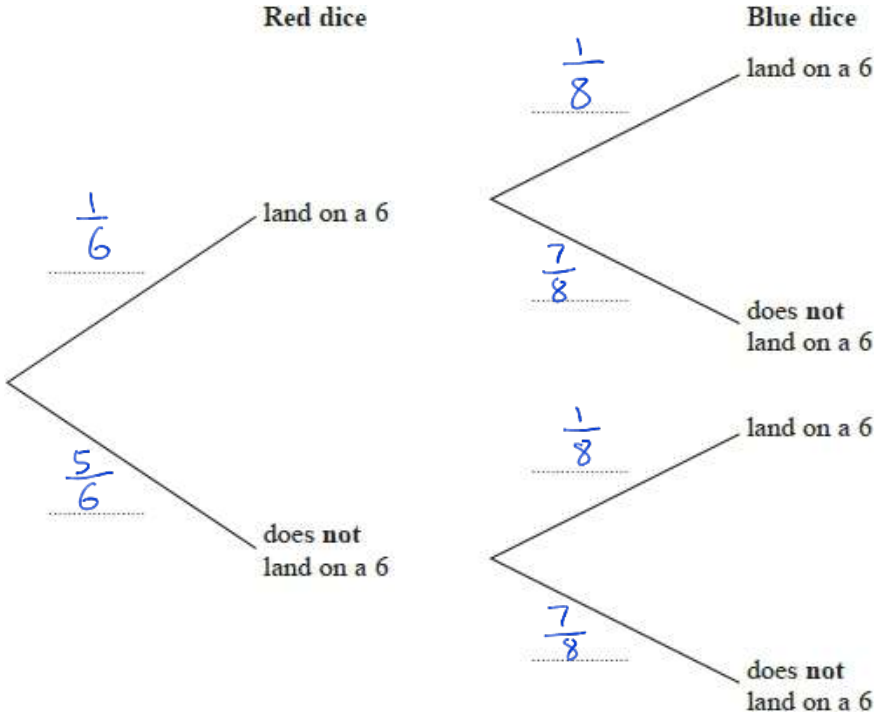
(Total for question = 4 marks)

Q3. NON-CALCULATOR

Graham has a fair red 6-sided dice and a fair blue 8-sided dice.
The red dice can land on 1, 2, 3, 4, 5 or 6
The blue dice can land on 1, 2, 3, 4, 5, 6, 7 or 8

Graham is going to roll both dice.

(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that neither dice will land on a 6

P(not 6 AND not 6) = P(not 6) × P(not 6)
= 5/6 × 7/8

35/48

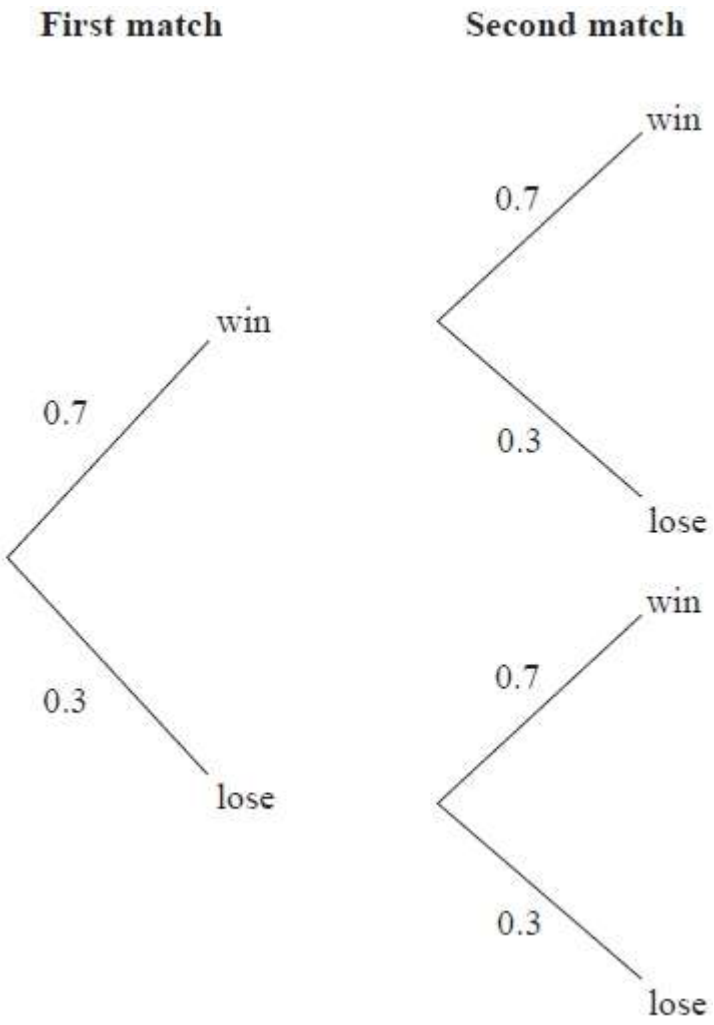
(2)

(Total for question = 4 marks)

Q4. CALCULATOR ALLOWED

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.



(a) Work out the probability that Finlay wins both matches.

P(win AND win) = P(win) × P(win)
= 0.7 × 0.7

0.49

.....

(2)

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

P(lose 1 or both matches) = 1 − P(win both)
= 1 − 0.49

0.51

.....

(2)

(Total for question is 4 marks)

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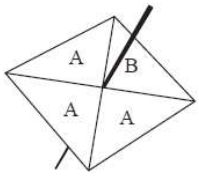
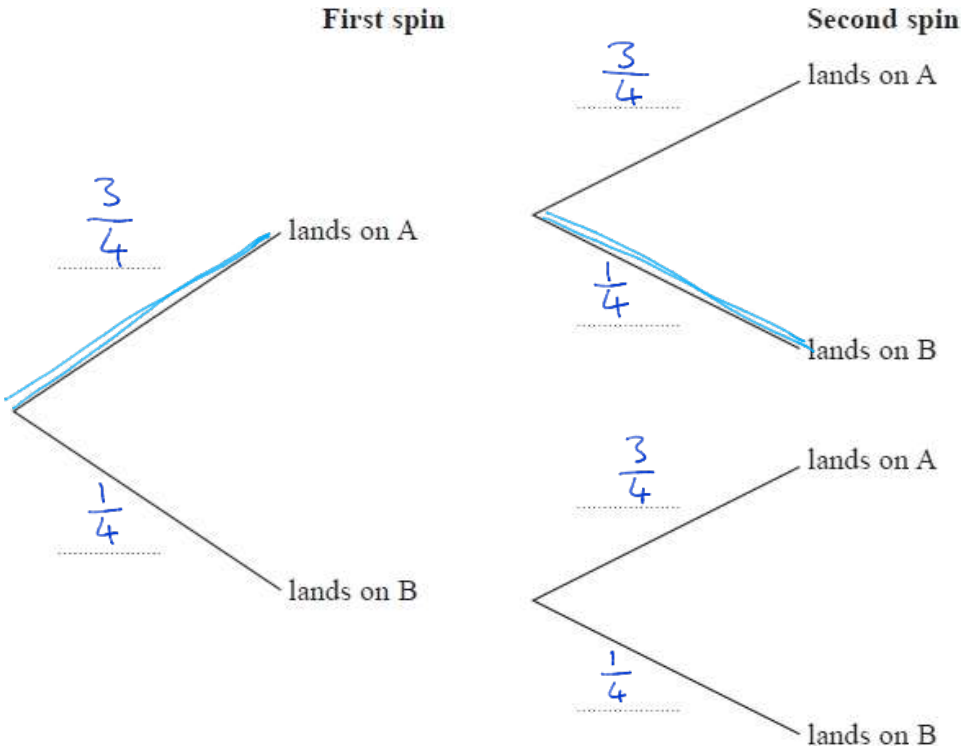
Q5. CALCULATOR ALLOWED

The diagram shows a fair 4-sided spinner. Hasmeet is going to spin the spinner twice.



(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that the spinner will land on A on the first spin and will land on B on the second spin.

P(land on A AND THEN land on B) = P(land on A) × P(land on B)

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

$\frac{3}{16}$

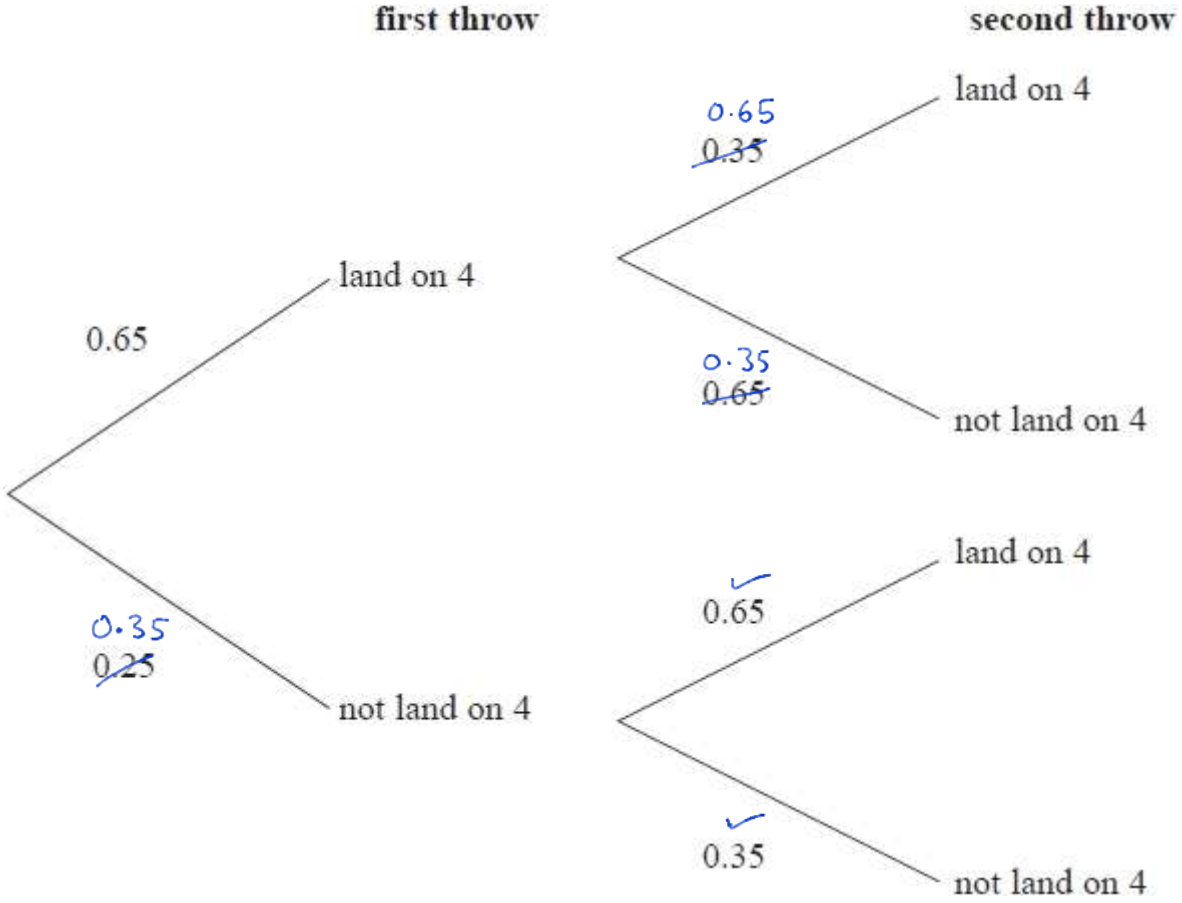
(2)

(Total for question = 4 marks)

Q6. CALCULATOR ALLOWED

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 the probability tree diagram shown.
The diagram is **not** correct.



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

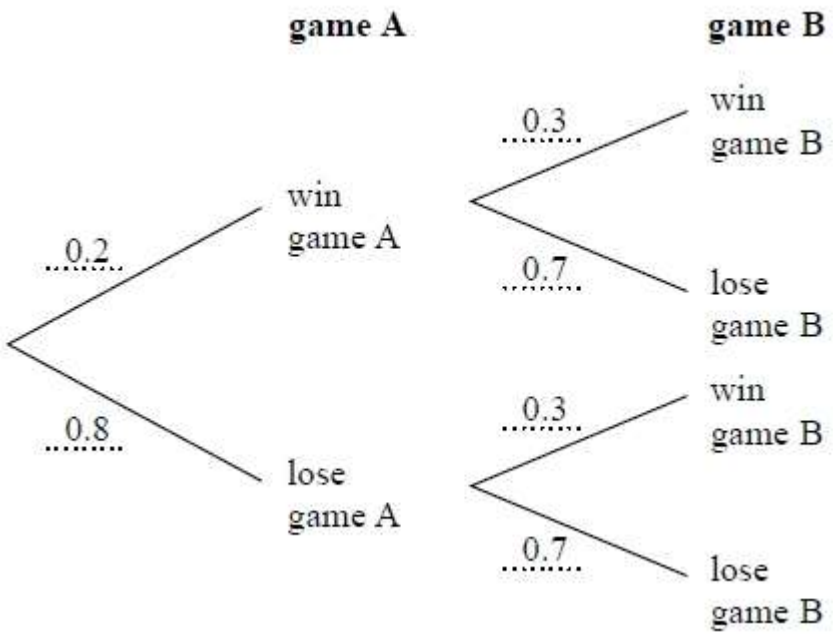
1 P(not land on 4) should be 1 - P(land on 4)
= 0.35

2 The probabilities on the second set of branches should exactly match the first set of branches.

(Total for question = 2 marks)

Q7. CALCULATOR ALLOWED

Here is a probability tree diagram.



Work out the probability of winning both games.

P(Win game A AND win Game B) = P(Win Game A) × P(Win Game B)

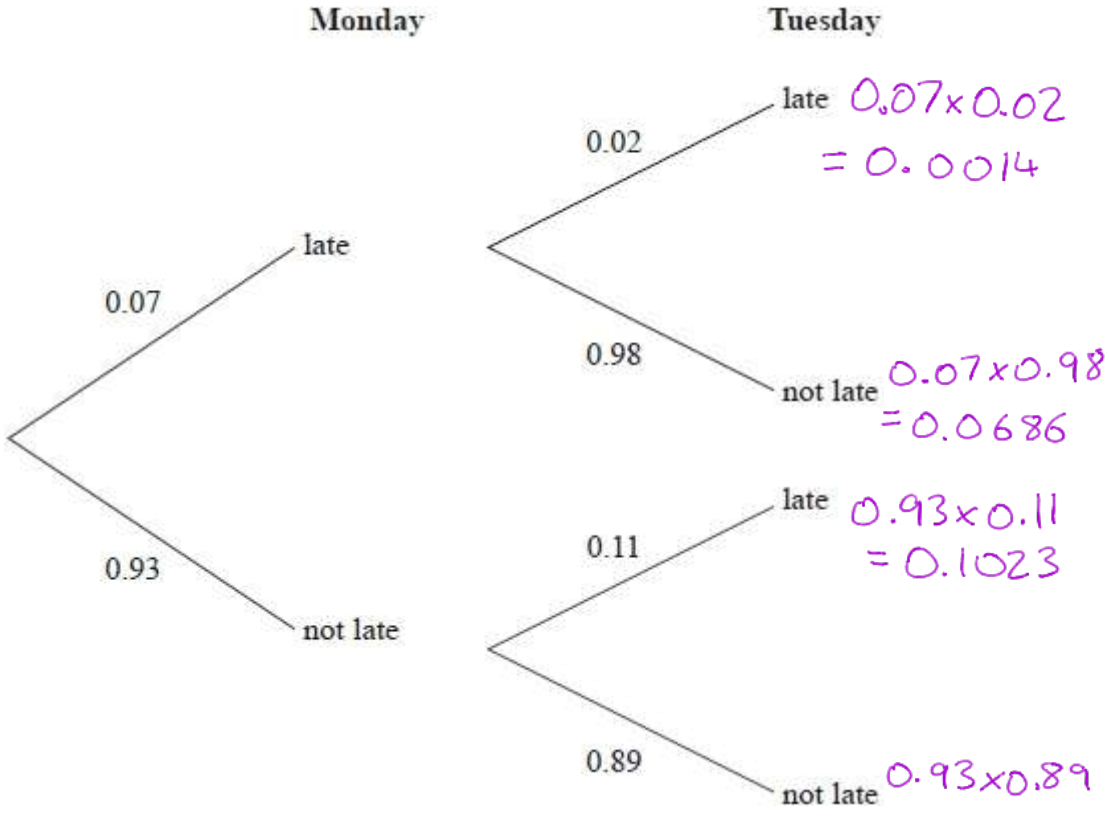
= 0.2 × 0.3

0.06

(Total for question = 2 marks)

Q8. CALCULATOR ALLOWED

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.

P(late on exactly 1 day)

= P(late on Mon AND not late on Tues) + P(not late on Mon AND late on Tues)

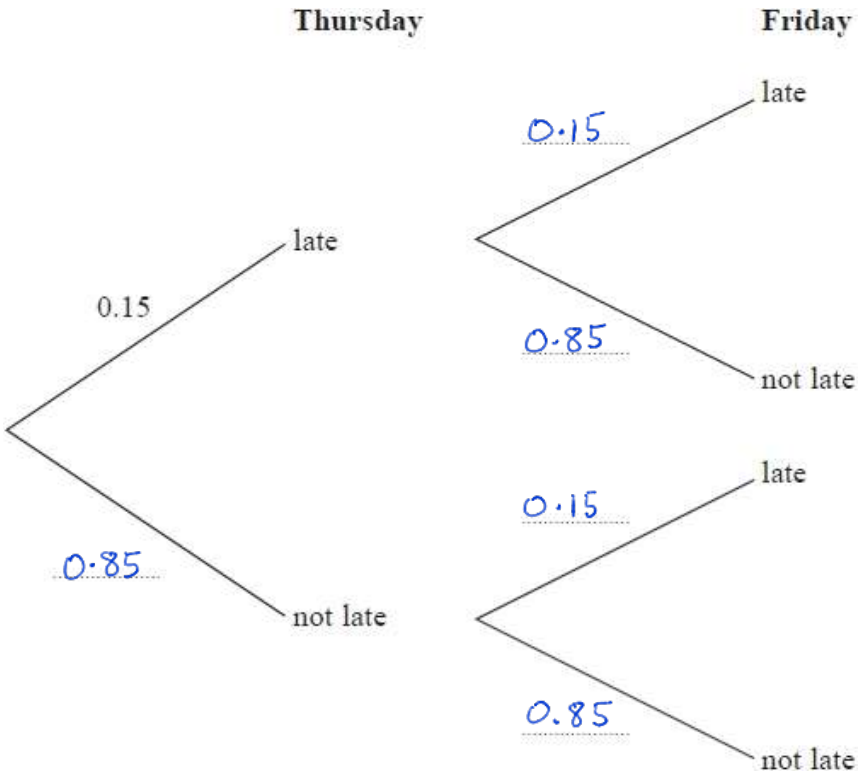
= (0.07 × 0.98) + (0.93 × 0.11) 0.1709

(Total for question = 3 marks)

Q9. CALCULATOR ALLOWED

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.

$P(\text{late on at least 1 day}) = 1 - P(\text{not late AND not late})$

$= 1 - (0.85 \times 0.85)$

0.2775

(3)

(Total for question = 5 marks)

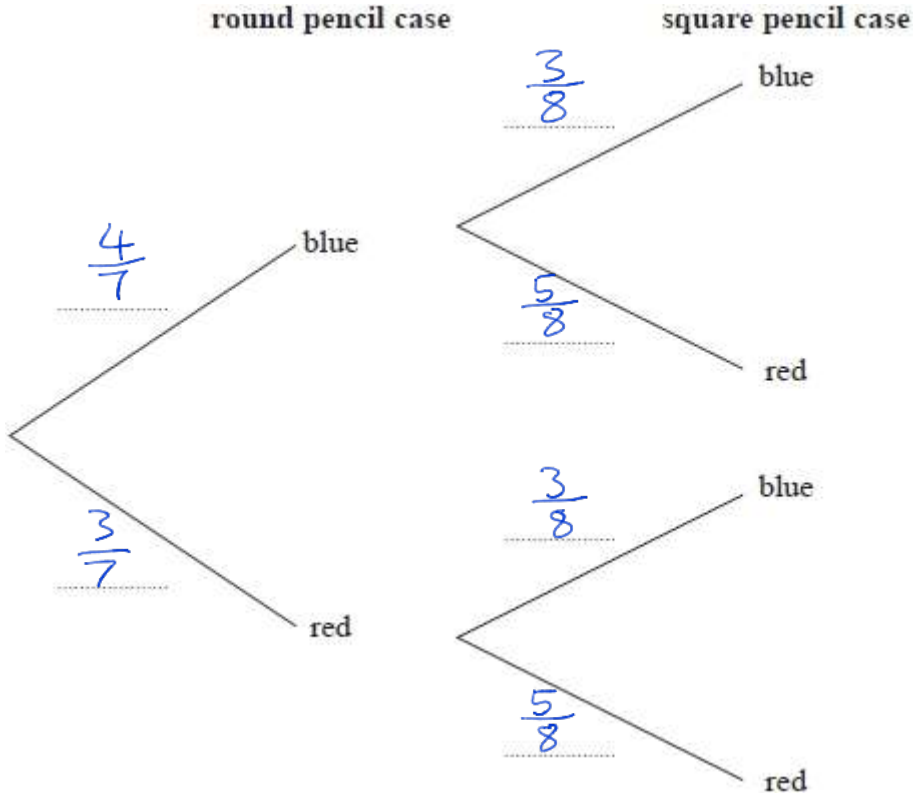
Q10. CALCULATOR ALLOWED

Sameena has a round pencil case and a square pencil case.

There are 4 blue pens and 3 red pens in the round pencil case.
There are 3 blue pens and 5 red pens in the square pencil case.

Sameena takes at random one pen out of each pencil case.

(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that the pens Sameena takes are both red.

P(red AND red) = P(red) × P(red)

= 3/7 × 5/8

15/56

(2)

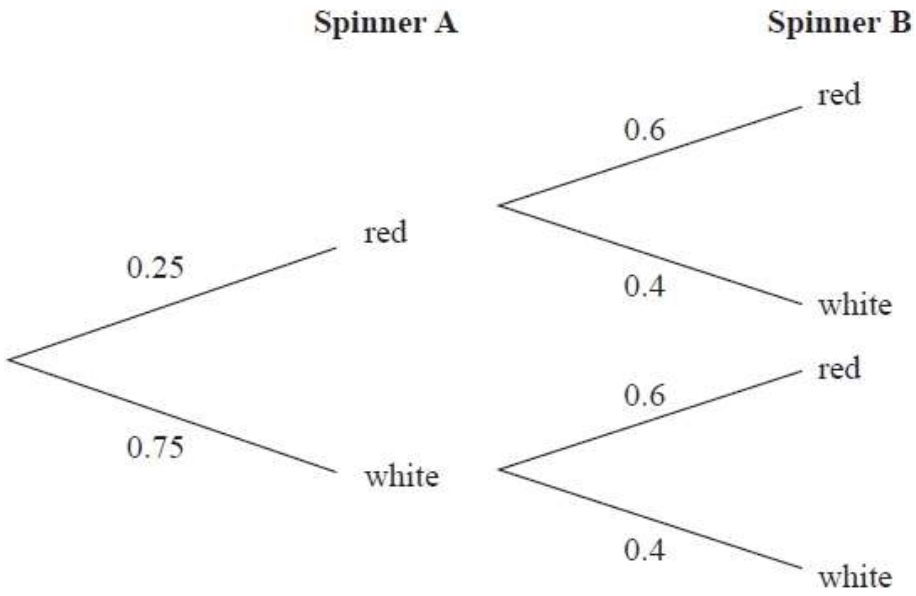
(Total for question = 4 marks)

Q11. CALCULATOR ALLOWED

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.

P(Red AND Red) = 0.25 × 0.6
= 0.15

P(White AND White) = 0.75 × 0.4
= 0.3

0.15 ≡ 24 times (×2)
0.3 ≡ (×2)

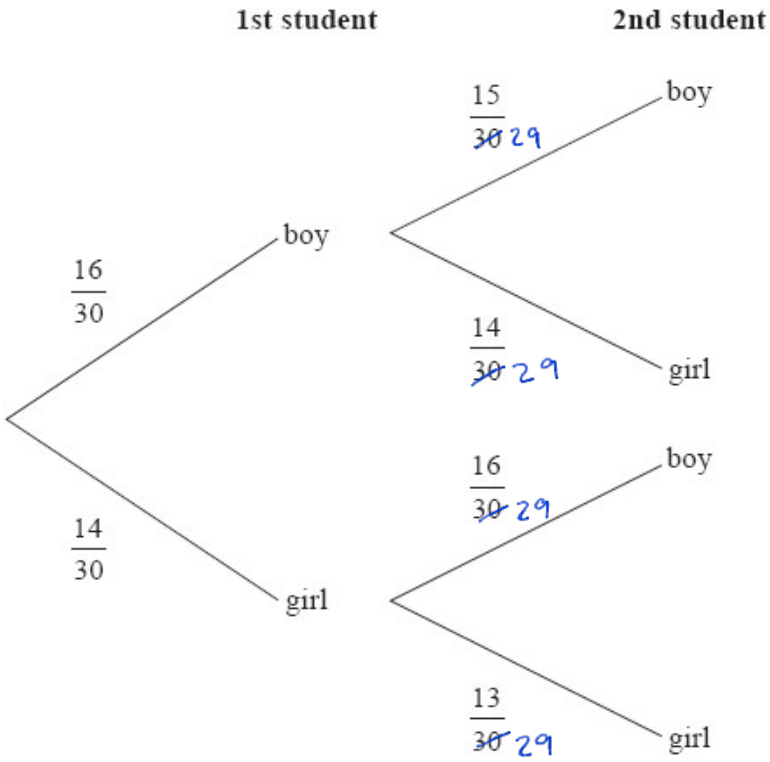
48

(Total for question = 3 marks)

Q12. CALCULATOR ALLOWED

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.

The denominators on the 2nd set of branches are incorrect - there are 29 pupils to pick from.

(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.

He is wrong. The probabilities should be multiplied.
P(Owen scores AND Wasim scores) = 0.4 × 0.25

(1)

(Total for question = 2 marks)

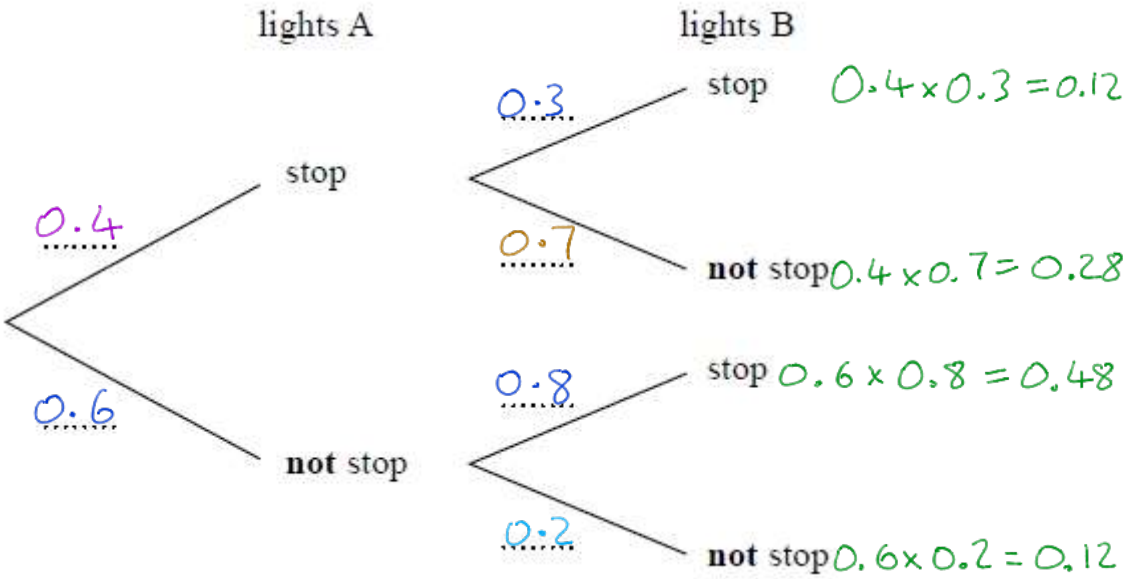
Q13. CALCULATOR ALLOWED

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

(a) Complete the probability tree diagram for this information.



(2)

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

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

P(stopped by lights A) = 0.4

P(stopped by lights B) = (0.4 × 0.3) + (0.6 × 0.8)
= 0.12 + 0.48
= 0.6

It is more likely he is stopped by lights B.

(3)

(Total for question = 5 marks)