5.22 Probability Trees: 30-minute Pack

EDEXCEL 1MA1 · Calculator allowed · about 30 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

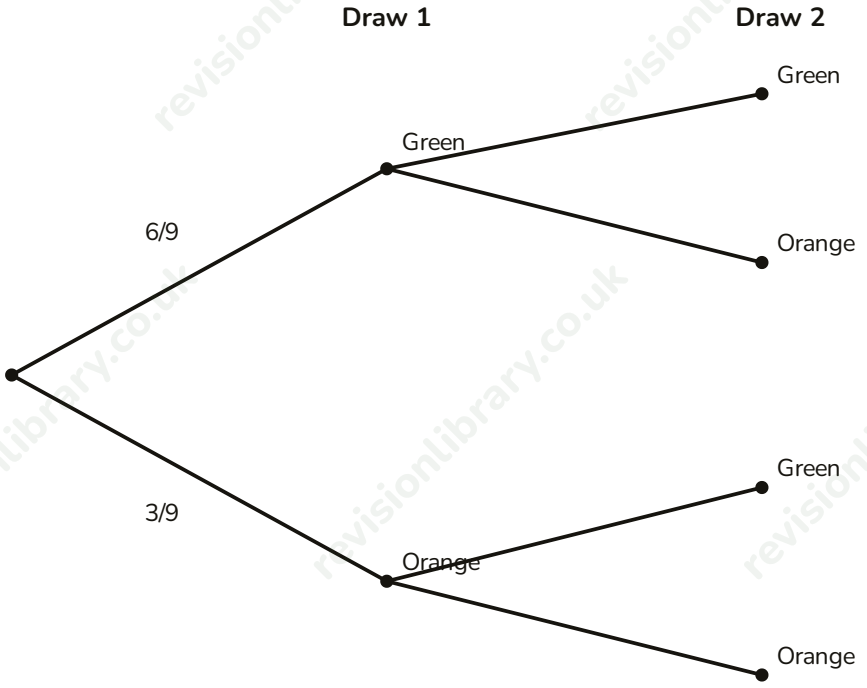
Answer ALL questions. Show all your working.

1 A fair 4-sided spinner has faces labelled 1, 2, 3, 4 equally likely. If the spinner lands on 1 or 2, Jamal then tosses a coin. If it lands on 3 or 4, he rolls a fair 4-sided die numbered 1 to 4. Find the probability that Jamal gets a tail on the coin or a 4 on the die.

(Total for Question 1 is 3 marks)

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2 A jar contains 6 green marbles and 3 orange marbles only. Ola takes a marble at random from the jar and does not replace it. She then takes a second marble at random.



(Not to scale)

(a) Complete the probability tree diagram, writing each missing probability as a fraction. **(2)**

(b) Calculate the probability that both marbles are the same colour. **(3)**

(c) Calculate the probability that at least one of the two marbles is orange. **(3)**

(Total for Question 2 is 8 marks)

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3 Aisha plays a game against a computer program twice. In each game, independently, the probability she Wins is 0.5, the probability of a Draw is 0.3, and the probability she Loses is 0.2.

(a) Find the probability that Aisha wins both games. **(2)**

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(b) Find the probability that Aisha gets one Win and one Draw, in either order. **(3)**

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(Total for Question 3 is 5 marks)

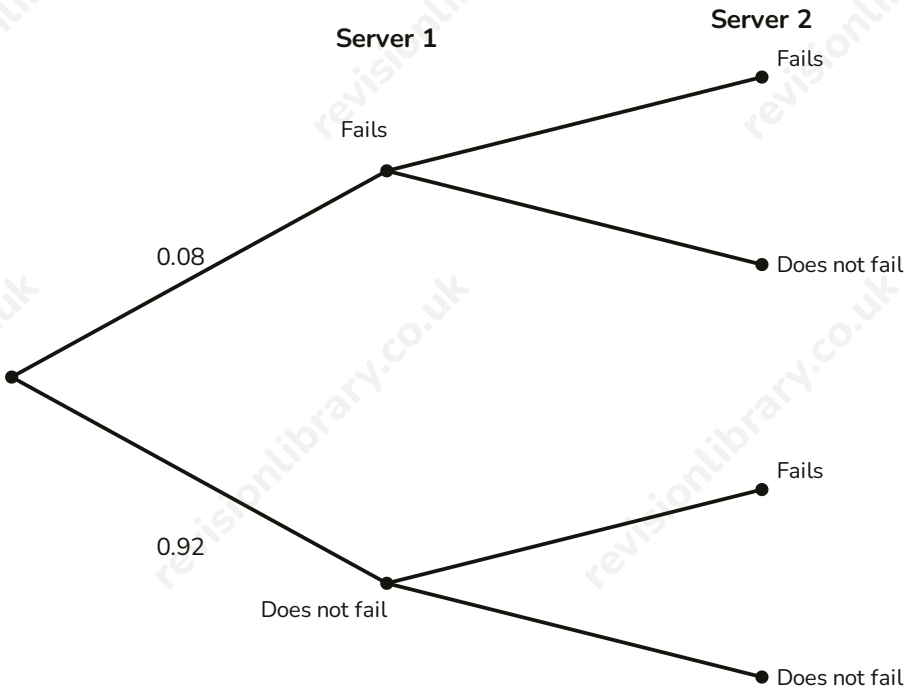
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4 A fruit basket contains 10 apples and 5 oranges only. Two pieces of fruit are taken from the basket at random, one after another, without replacement. Find the probability that at least one apple is taken.

(Total for Question 4 is 3 marks)

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5 Server 1 and Server 2 at a small company operate independently of each other. On any given day, the probability that Server 1 fails is 0.08. The probability that Server 2 fails is 0.05.



(Diagram NOT to scale)

(a) Complete the probability tree diagram for a single day, showing both servers. **(2)**

(b) Calculate the probability that exactly one of the two servers fails on a given day. **(3)**

.....

(Total for Question 5 is 5 marks)

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Mark scheme · 5.22 Probability Trees: 30-minute Pack

Question 1

identify P(spin 1 or 2) = 2/4 and P(spin 3 or 4) = 2/4 and multiply: 2/4 x 1/2 and 2/4 x 1/4	**M1**
add the two probabilities	**M1**
1/4 + 1/8 = 3/8 cao	**A1**

Answer: 3/8

Question 2

(a) 5/8 and 3/8 on the branches after Green	**B1**
(a) 6/8 and 2/8 on the branches after Orange	**B1**

(a) Answer: After Green: Green 5/8, Orange 3/8. After Orange: Green 6/8, Orange 2/8

(b) 6/9 x 5/8 (or 3/9 x 2/8) for one correct product	**M1**
(b) 6/9 x 5/8 + 3/9 x 2/8 (both same-colour products added)	**M1**
(b) 1/2 oe (e.g. 36/72)	**A1**

(b) Answer: 1/2

(c) 6/9 x 5/8 (= P(both green))	**M1**
(c) 1 - 6/9 x 5/8	**M1**
(c) 7/12 oe (e.g. 42/72)	**A1**

(c) Answer: 7/12

Question 3

(a) 0.5 x 0.5	**M1**
(a) 0.25 cao	**A1**

(a) Answer: 0.25

(b) 0.5 x 0.3 (or 0.3 x 0.5) for one correct route	**M1**
(b) 0.5 x 0.3 + 0.3 x 0.5 (both routes added)	**M1**
(b) 0.3 cao	**A1**

(b) Answer: 0.3

Question 4

5/15 x 4/14 (= P(both oranges))	**M1**
1 - 5/15 x 4/14	**M1**
19/21 oe (e.g. 1 - 2/21, awrt 0.905)	**A1**

Answer: 19/21

Question 5

(a) 0.92 and 0.08 on the Server 1 branches	**B1**
(a) 0.95 and 0.05 on the Server 2 branches	**B1**

(a) Answer: Server 1: Fails 0.08, Does not fail 0.92. Server 2: Fails 0.05, Does not fail 0.95

(b) 0.08 x 0.95 (or 0.92 x 0.05) for one correct route	**M1**
(b) 0.08 x 0.95 + 0.92 x 0.05 (both routes added)	**M1**
(b) 0.122 cao	**A1**

(b) Answer: 0.122

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