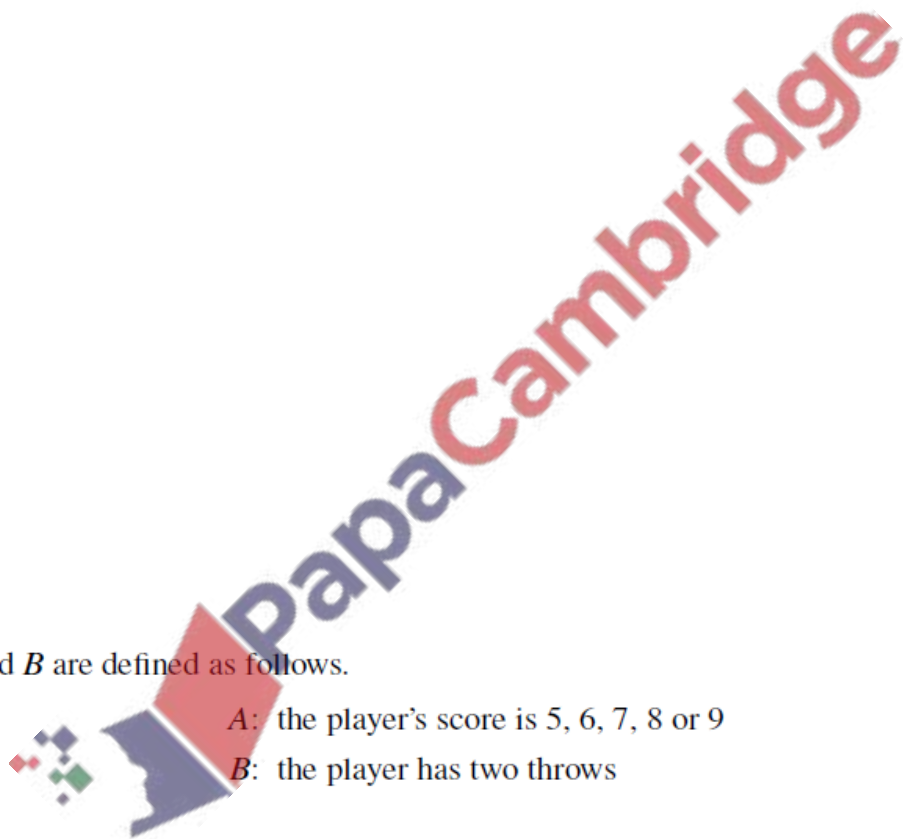


1. Nov/2022/Paper_9709_51/No.5

A game is played with an ordinary fair 6-sided die. A player throws the die once. If the result is 2, 3, 4 or 5, that result is the player's score and the player does not throw the die again. If the result is 1 or 6, the player throws the die a second time and the player's score is the sum of the two numbers from the two throws.

(a) Draw a fully labelled tree diagram to represent this information. [2]



Events A and B are defined as follows.

A : the player's score is 5, 6, 7, 8 or 9

B : the player has two throws

(b) Show that $P(A) = \frac{1}{3}$. [3]

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(c) Determine whether or not events A and B are independent.

[2]

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(d) Find $P(B | A')$.

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2. Nov/2022/Paper_9709_52/No.5

Eric has three coins. One of the coins is fair. The other two coins are each biased so that the probability of obtaining a head on any throw is $\frac{1}{4}$, independently of all other throws. Eric throws all three coins at the same time.

Events A and B are defined as follows.

A : all three coins show the same result

B : at least one of the biased coins shows a head

(a) Show that $P(B) = \frac{7}{16}$. [2]

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(b) Find $P(A | B)$. [2]

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3. Nov/2022/Paper_9709_52/No.1

On any day, Kino travels to school by bus, by car or on foot with probabilities 0.2, 0.1 and 0.7 respectively. The probability that he is late when he travels by bus is x . The probability that he is late when he travels by car is $2x$ and the probability that he is late when he travels on foot is 0.25.

The probability that, on a randomly chosen day, Kino is late is 0.235.

(a) Find the value of x . [3]

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(b) Find the probability that, on a randomly chosen day, Kino travels to school by car given that he is not late. [2]

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4. Nov/2022/Paper_9709_53/No.7

Sam and Tom are playing a game which involves a bag containing 5 white discs and 3 red discs. They take turns to remove one disc from the bag at random. Discs that are removed are not replaced into the bag. The game ends as soon as one player has removed two red discs from the bag. That player wins the game.

Sam removes the first disc.

- (a) Find the probability that Tom removes a red disc on his first turn. [2]

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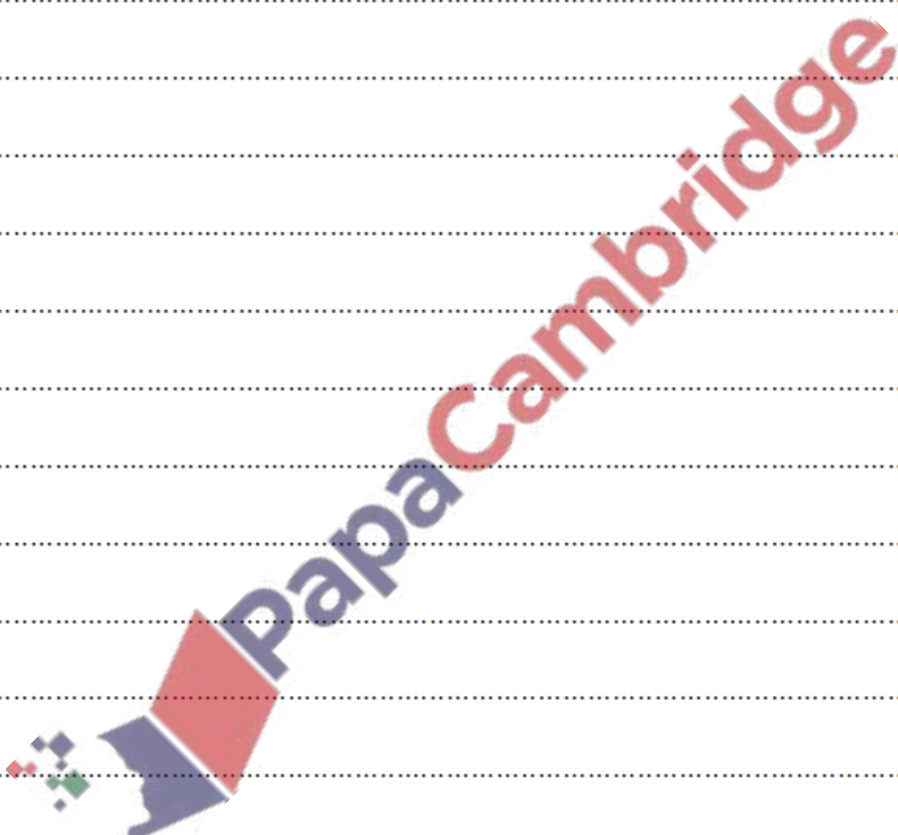
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(b) Find the probability that Tom wins the game on his second turn.

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(c) Find the probability that Sam removes a red disc on his first turn given that Tom wins the game on his second turn.

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