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 $\mathrm{P}(A) = \frac{1}{3}$. [3]

.....

.....

.....

.....

.....

.....

.....

.....

.....

(c) Determine whether or not events A and B are independent. [2]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(d) Find $\mathrm{P}(B \mid A')$. [3]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....