

Figure 1

Figure 1 shows a Venn diagram with two events, A and B , and their associated probabilities.

$$\begin{aligned} P(A) &= \frac{2}{5} + \frac{4}{15} = \frac{2}{3} \\ P(B) &= \frac{4}{15} + \frac{1}{4} = \frac{31}{60} \end{aligned}$$

(1 mark)

- (a) Explain whether or not events A and B are independent.
Show your working clearly.

$$\text{(a) contd } P(A) \times P(B) = \frac{2}{3} \times \frac{31}{60} = \frac{31}{90} \quad (1 \text{ mark}) \quad (3)$$

- (b) Find $P(B|A')$ $P(A \cap B) = \frac{4}{15} \neq \frac{31}{90} = P(A) \times P(B)$
so A & B are not independent (1 mark) (2)

- (c) Complete the tree diagram in Figure 2 by calculating the probabilities associated with each branch.

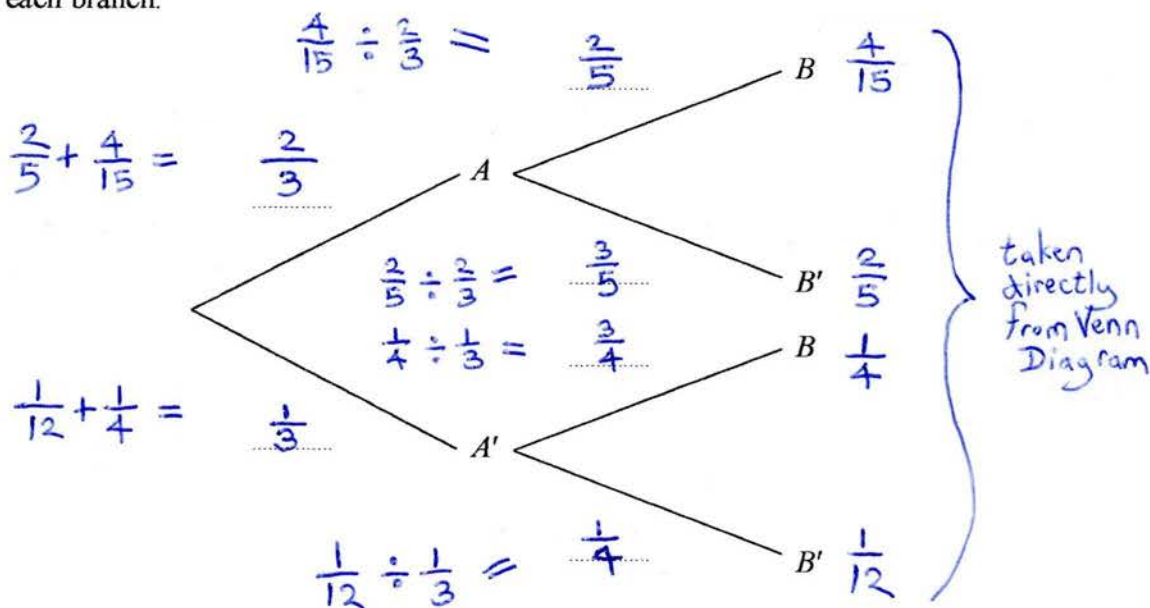


Figure 2

(4)

Turn over for a spare copy of Figure 2 if you need to redraw your tree diagram.

$$(b) P(B|A') = \frac{P(B \cap A')}{P(A')} = \frac{\frac{1}{4}}{\frac{1}{12} + \frac{1}{4}} \quad (1 \text{ mark})$$

$$= \frac{\frac{1}{4}}{\frac{1}{3}} = \frac{1}{4} \times \frac{12}{4} = \frac{12}{16} = \frac{3}{4} \quad (1 \text{ mark})$$