Conditional probabilities from tables/trees

6 questions | 14 marks

Equivalent correct methods earn the corresponding marks.

1. Using the club table, find $P(\text{drama} \mid \text{music})$. [2 marks]

Invented membership data for 60 students.

Music membership	Drama	Not drama	Total
Music	8	12	20
Not music	10	30	40
Total	18	42	60

$\frac{8}{20} = \frac{2}{5}$.

Answer: $\frac{2}{5}$.

2. Find $P(\text{not drama} \mid \text{not music})$. [2 marks]

Invented membership data for 60 students.

Music membership	Drama	Not drama	Total
Music	8	12	20
Not music	10	30	40
Total	18	42	60

$\frac{30}{40} = \frac{3}{4}$.

Answer: $\frac{3}{4}$.

3. Find $P(\text{music and drama})$. [2 marks]

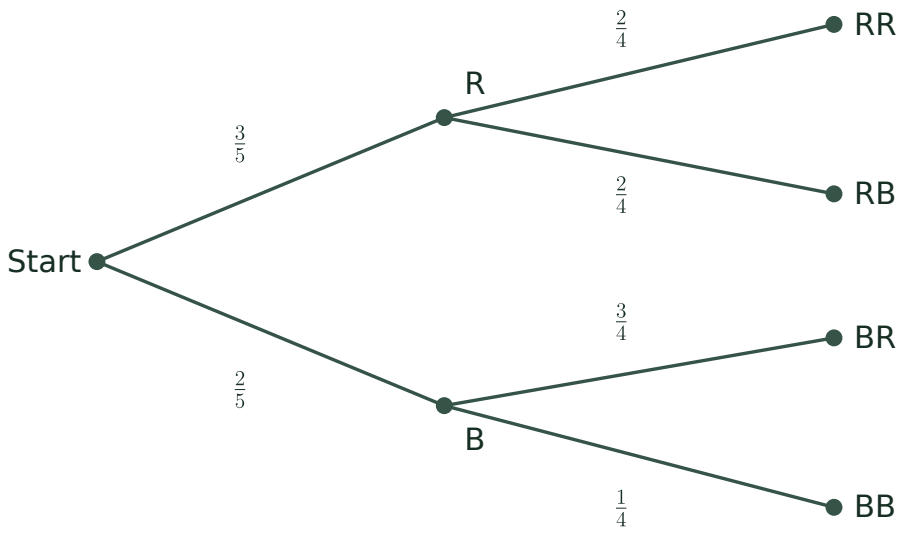
Invented membership data for 60 students.

Music membership	Drama	Not drama	Total
Music	8	12	20
Not music	10	30	40
Total	18	42	60

8 of all 60 do both; $\frac{8}{60} = \frac{2}{15}$.

Answer: $\frac{2}{15}$.

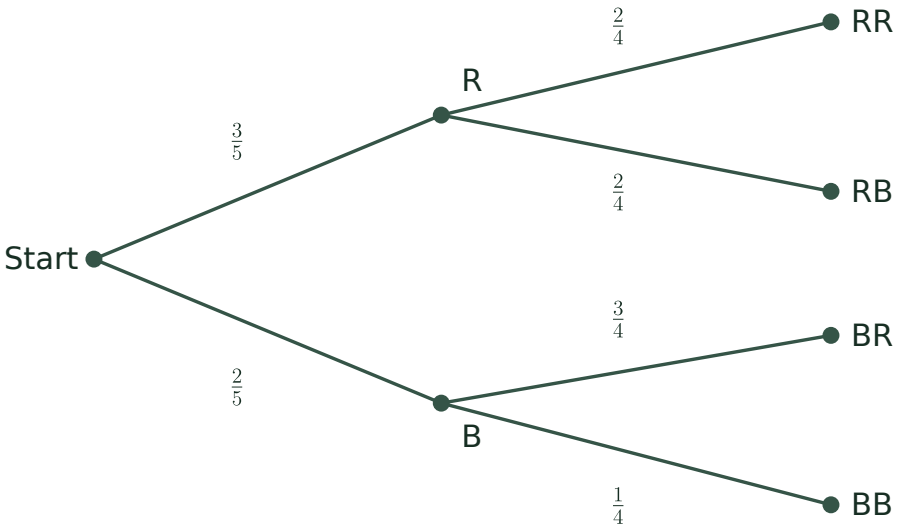
4. Use the tree to find $P(\text{two red})$. [2 marks]



$(\frac{3}{5})(\frac{2}{4}) = \frac{3}{10}$.

Answer: $\frac{3}{10}$.

5. Use the tree to find $P(\text{at least one red})$. [3 marks]

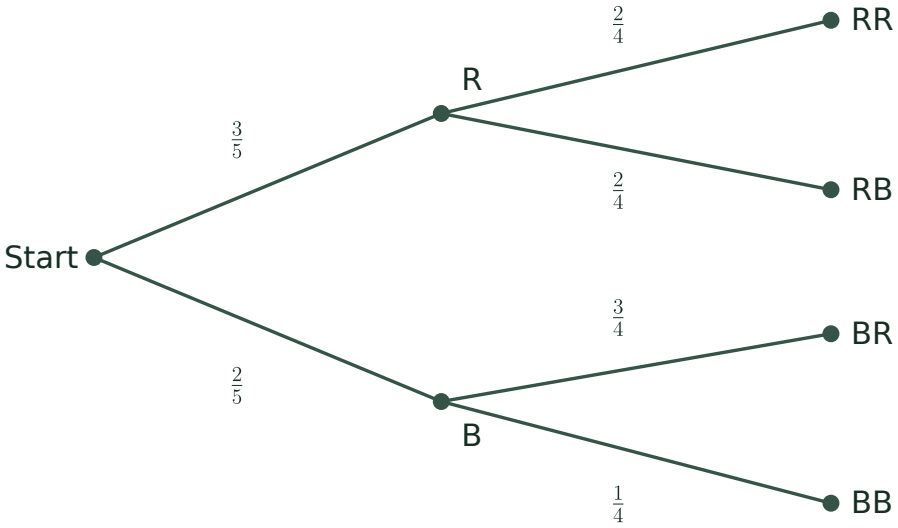


The only excluded outcome is BB with probability $\frac{1}{10}$.

$1 - \frac{1}{10} = \frac{9}{10}$.

Answer: $\frac{9}{10}$.

6. Explain how to check that a completed four-leaf tree is consistent. [3 marks]



For this tree the leaf probabilities are $\frac{3}{10}, \frac{3}{10}, \frac{3}{10}, \frac{1}{10}$.

Their sum is 1.

Answer: Every split totals 1, and all leaf probabilities total 1.