

Section 1: Conditional probability

Crucial points

1. Remember that you cannot simply add probabilities to calculate $P(A \cup B)$ if the probabilities are not mutually exclusive

 $P(A \cup B) = P(A) + P(B)$ only if A and B are mutually exclusive events.

 $P(A \cup B) = P(A) + P(B) - P(A \cap B)$ **ALWAYS** because when A and B are mutually exclusive, $P(A \cap B) = 0$.

2. Make sure you understand clearly the difference between $P(A \cap B)$ and $P(A \cup B)$

 $P(A \cap B)$ is the probability that both event A and event B occur. It is equal to 0 for mutually exclusive events.

 $P(A \cup B)$ is the probability that event A or event B or both events A and B occur.

3. Check your working!

Make sure your answer is sensible; it is easy to make mistakes with decimals or fractions. When using tree diagrams, it is useful to check that all the probabilities on a branch add up to 1.

4. Using a tree diagram can reduce error and simplify problems On some simpler problems you will not need to draw a tree diagram, but it is a very useful method to show all outcomes and probabilities

and reduces errors in copying information from the question.

5. Learn and understand the conditional probability formula

The formula for conditional probability is:

$$P(B \mid A) = \frac{P(B \cap A)}{P(A)}$$

which can be rearranged to produce: $P(A \cap B) = P(A)P(B | A) P$

Memorise them and understand how they work.

6. Read the question carefully!

Be careful with the phrasing of the question. Sometimes the wording starts with 'Given that......'

If you are using P(A|B), remember that B is the event you are given.

