Section 1: Working with probability

Crucial points

1. **Make sure your answer is sensible**
   If you get a probability which is greater than 1, you **must** have made an error! When using a tree diagram, it's useful to check that the probabilities of all the possible answers add up to 1.

2. **Use the correct notation to help you explain your answers**
   Correct notation will make your life easier and will help an examiner to give you the marks you deserve.
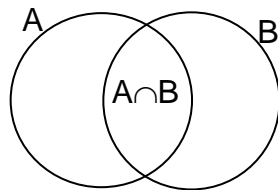
3. **Remember that you can only add probabilities to find P($A \cup B$) if the events are mutually exclusive**
   For example, if you want to find the probability that a student chosen at random studies either Maths or English, you need to take into account that some students might study both Maths and English – these events are not mutually exclusive.

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

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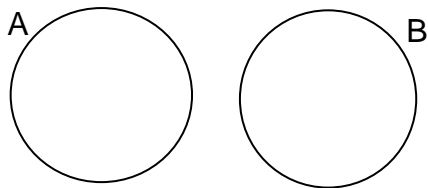
   P($A \cup B$) = P(A)+P(B) - P($A \cap B$) **ALWAYS** because when A and B are mutually exclusive, P($A \cap B$) = 0.

   A ◯◯ B A∩B

4. **Remember that you can only multiply probabilities to find P(A∩B) if the events are independent**
   To take a very simple example, suppose you want to find the probability that when you throw one dice you get a number that is both an odd number and a prime number. P(odd) $= \frac{1}{2}$ and P(prime) $= \frac{1}{2}$ (2, 3 and 5 are prime) but P(odd and prime) is not $\frac{1}{2} \times \frac{1}{2} = \frac{1}{2}$ as there are two odd prime numbers, 3 and 5, so the probability is $\frac{2}{6} = \frac{1}{3}$. A number being odd, and a number being prime, are not independent.

5. **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.

6. **Recognise there may be several different methods of solving a probability question**
   Think about whether using a sample space diagram, a Venn diagram or a tree diagram might be helpful.

7. **Read the question carefully to ensure you have answered the correct problem**
   For example, there is a difference between the event of a train being late once in two journeys and the event being late on the first journey and not on the second.