Y9 Maths Knowledge Organiser Topic 12: Probability of Multiple Events

What must I be able to do?

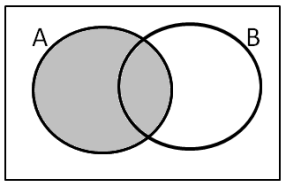
New content:

- ☐ Use Venn diagrams to solve probability questions
  - ➢ Mathswatch 185 (GCSE)
- ☐ Use probability tree diagrams to work out probabilities involved in combined events
  - ➢ Mathswatch 151 (GCSE)
- ☐ Be able to use an AND/OR method to solve a more complex probability question where using a tree diagram would be unrealistic
  - ➢ Mathswatch 204 (GCSE)
- ☐ Work out the probability of combined events with conditional probability
  - ➢ Mathswatch 175 (GCSE)

Key vocabulary

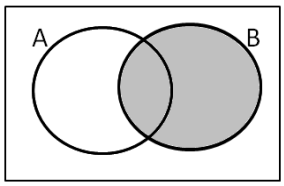
Independent	Where the outcome of one experiment does not affect the probability of a second.
AND	The outcome has to satisfy both conditions at the same time.
OR	The outcome has to satisfy one condition, or the other, or both.

Venn diagrams



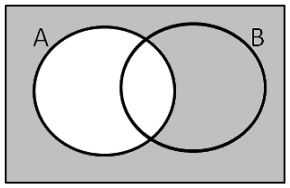
Probability of A

P(A)



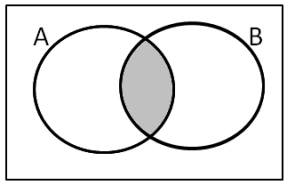
Probability of B

P(B)



Probability of not A

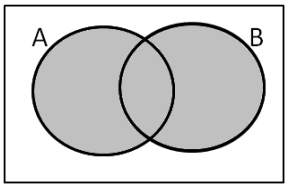
P(A')



Probability of A and B

P(A ∩ B)

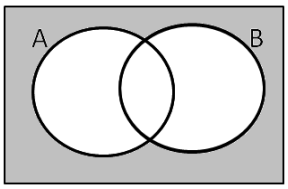
Also called the intersection



Probability of A or B

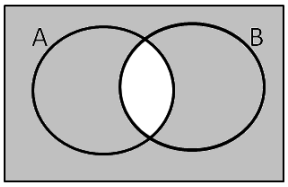
P(A ∪ B)

Also called the union



Probability of not A and not B

P(A' ∩ B')



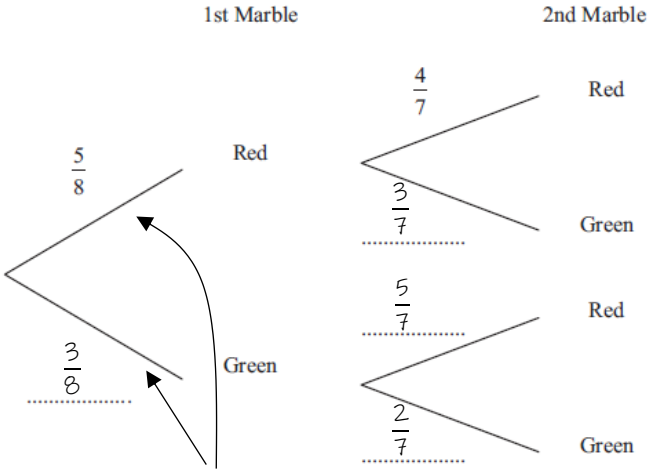
Probability of not A or not B

P(A' ∪ B')

Tree diagrams

There are only red marbles and green marbles in a bag. There are 5 red marbles and 3 green marbles. Dwayne takes at random a marble from the bag. He does not put the marble back in the bag. Dwayne takes at random a second marble from the bag.

(a) Complete the probability tree diagram
(b) Work out the probability that Dwayne takes marbles of different colours.



Probabilities on each set of branches sum to 1

Different colours are:

Red AND Green OR Green AND Red.

So... $\frac{5}{8} \times \frac{3}{7}$ + $\frac{3}{8} \times \frac{5}{7} = \frac{15}{56} + \frac{15}{56} = \frac{30}{56}$

Multiply along the branches – red branch for 1st marble, then green branch for 2nd marble. AND implies we multiply the probabilities

We add the probabilities of different outcomes together. OR implies addition.