

Y9 Maths Knowledge Organiser Topic 9: Probability of Multiple Events

What must I be able to do?	Key vocabulary
New content: <ul style="list-style-type: none"> Use Venn diagrams to solve probability questions ➤ Sparx M329, M419 Use probability tree diagrams to work out probabilities involved in combined events ➤ Sparx M299 Be able to use an AND/OR method to solve a more complex probability question where using a tree diagram would be unrealistic Work out the probability of combined events with conditional probability ➤ Sparx B604 	Independent where the <u>outcome of one</u> experiment <u>does not affect the probability</u> of a <u>second</u> . AND The outcome has to satisfy <u>both</u> conditions at the <u>same time</u> . OR The outcome has to satisfy <u>one</u> condition, <u>or the other, or both</u> .

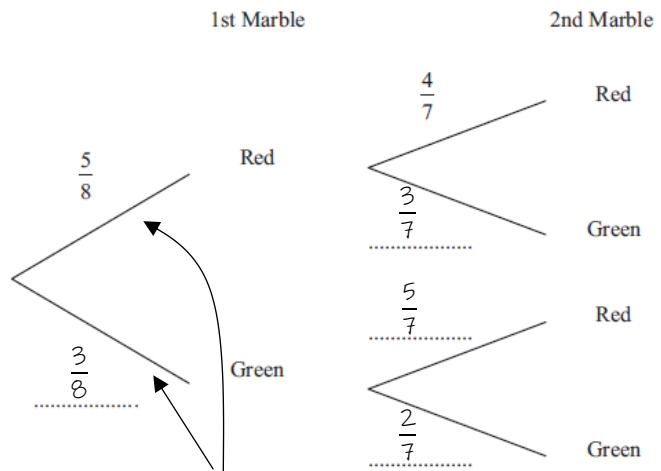
Venn diagrams

1. Probability of A: $P(A)$ (Left circle shaded)
 2. Probability of B: $P(B)$ (Right circle shaded)
 3. Probability of not A: $P(A')$ (Area outside circle A shaded)
 4. Probability of A and B: $P(A \cap B)$
 Also called the intersection
 5. Probability of A or B: $P(A \cup B)$
 Also called the union
 6. Probability of not A and not B: $P(A' \cap B')$
 7. Probability of not A or not B: $P(A' \cup B')$

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.

- Complete the probability tree diagram
- 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.