

# Y9 Maths Knowledge Organiser Topic 9: Probability of Single Events

What must I be able to do?	Key vocabulary												
<b>New content:</b> <ul style="list-style-type: none"> <li>Use the probability scale and language of probability ➤ Sparx M655</li> <li>Calculate the probability of an outcome of an event happening or not happening ➤ Sparx M941</li> <li>Recognise mutually exclusive and exhaustive events ➤ Sparx M755</li> <li>Calculate experimental probabilities and relative frequencies from experiments. Use these to predict the likely number of successful outcomes. ➤ Sparx M206</li> <li>Apply systematic listing and counting strategies to identify all possible outcomes ➤ Sparx U369</li> <li>Read two way tables and use them to solve probabilities ➤ Sparx M899</li> <li>Understand and use frequency tree diagrams ➤ Sparx B532</li> </ul>	<table border="1"> <tr> <td><b>Outcome</b></td> <td>A <u>result</u> of a probability experiment.</td> </tr> <tr> <td><b>Event</b></td> <td>A <u>set of outcomes</u> of a probability experiment.</td> </tr> <tr> <td><b>Mutually exclusive</b></td> <td>Events which <u>cannot happen at the same time</u>.</td> </tr> <tr> <td><b>Exhaustive</b></td> <td><u>All possible outcomes</u> have been included.</td> </tr> <tr> <td><b>Relative Frequency</b></td> <td>In an experiment, the <u>number of times an event occurs</u> ÷ the <u>total number of trials</u>.</td> </tr> <tr> <td><b>Sample Space</b></td> <td>The <u>set of all possible outcomes</u>. When in a table or list, it is often described as a sample space diagram.</td> </tr> </table>	<b>Outcome</b>	A <u>result</u> of a probability experiment.	<b>Event</b>	A <u>set of outcomes</u> of a probability experiment.	<b>Mutually exclusive</b>	Events which <u>cannot happen at the same time</u> .	<b>Exhaustive</b>	<u>All possible outcomes</u> have been included.	<b>Relative Frequency</b>	In an experiment, the <u>number of times an event occurs</u> ÷ the <u>total number of trials</u> .	<b>Sample Space</b>	The <u>set of all possible outcomes</u> . When in a table or list, it is often described as a sample space diagram.
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## The language of probability

The experiment is rolling the dice, the sample space is  $\{1,2,3,4,5,6\}$ , the event could be getting an even number  $\{2,4,6\}$  and the outcome is (in this case) even or odd. These two outcomes are mutually exclusive as a number cannot be both odd and even.

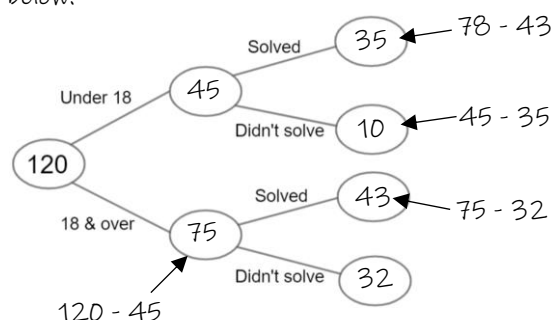
## Probability of an event not happening

The sum of all probabilities of an experiment is 1.

If the probability of something occurring is  $P(A)$ , then the probability it does not occur is  $1 - P(A)$ .

## Frequency trees

e.g. 120 people were given 3 minutes to solve a puzzle. 45 of the people who tried to solve the puzzle were under 18 years old. 78 of the people solved the puzzle. 32 of the people aged 18 and over did not solve the puzzle. Complete the frequency tree below.



The information given in the question determines the order of working. Here, we need to find the 75 first.

## Relative Frequency

Tom and Sarah roll a 5 sided die. The results are shown below:

Number	Frequency of each number	
	Tom	Sarah
1	1	10
2	0	3
3	3	11
4	1	7
5	1	5

- Write down two estimations of the probability of rolling a 4
- Which person's data is likely to be the closest to the actual probability of rolling a 4?
- Using your answer to b), how many 4s would you expect in 200 rolls?

Answer: a) Tom rolled one 4 in 6 attempts so  $\frac{1}{6}$

Sarah rolled seven 4s in 36 attempts so  $\frac{7}{36}$

36 is the sum of the frequency

- Sarah as she did the most trials.

- $\frac{7}{36} \times 200 = 38.888... = 39$  times.

Expectation = probability of success x number of trials

## Two way tables

Useful for representing information where there are 2 different categories, e.g. boys/girls and favourite subject.

	English	Maths	Science	PE
Boys				
Girls				