

## Topic: Basic Probability

Topic/Skill	Definition/Tips	Example
1. Probability	<p>The <b>likelihood/chance</b> of something happening.</p> <p>Is expressed as a number <b>between 0 (impossible) and 1 (certain)</b>.</p> <p>Can be expressed as a fraction, decimal, percentage or in words (likely, unlikely, even chance etc.)</p>	
2. Probability Notation	<b>P(A)</b> refers to the <b>probability that event A will occur</b> .	P(Red Queen) refers to the probability of picking a Red Queen from a pack of cards.
3. Theoretical Probability	$\frac{\text{Number of Favourable Outcomes}}{\text{Total Number of Possible Outcomes}}$	Probability of rolling a 4 on a fair 6-sided die = $\frac{1}{6}$ .
4. Relative Frequency	$\frac{\text{Number of Successful Trials}}{\text{Total Number of Trials}}$	<p>A coin is flipped 50 times and lands on Tails 29 times.</p> <p>The relative frequency of getting Tails = <math>\frac{29}{50}</math>.</p>
5. Expected Outcomes	To find the number of expected outcomes, <b>multiply the probability by the number of trials</b> .	<p>The probability that a football team wins is 0.2 How many games would you expect them to win out of 40?</p> <p style="text-align: center;"><math>0.2 \times 40 = 8 \text{ games}</math></p>
6. Exhaustive	<p>Outcomes are <b>exhaustive</b> if they <b>cover the entire range of possible outcomes</b>.</p> <p>The <b>probabilities</b> of an <b>exhaustive</b> set of outcomes <b>adds up to 1</b>.</p>	When rolling a six-sided die, the outcomes 1, 2, 3, 4, 5 and 6 are exhaustive, because they cover all the possible outcomes.
7. Mutually Exclusive	<p>Events are mutually exclusive if they <b>cannot happen at the same time</b>.</p> <p>The <b>probabilities</b> of an exhaustive set of <b>mutually exclusive</b> events <b>adds up to 1</b>.</p>	<p>Examples of mutually exclusive events:</p> <ul style="list-style-type: none"> <li>- Turning left and right</li> <li>- Heads and Tails on a coin</li> </ul> <p>Examples of non mutually exclusive events:</p> <ul style="list-style-type: none"> <li>- King and Hearts from a deck of cards, because you can pick the King of Hearts</li> </ul>
8. Frequency Tree	<p>A diagram showing how information is categorised into various categories.</p> <p>The <b>numbers</b> at the ends of branches tells us how often something happened (<b>frequency</b>).</p>	

	The <b>lines</b> connected the numbers are called <b>branches</b> .																																																		
9. Sample Space	The <b>set of all possible outcomes</b> of an experiment.	<table border="1"> <tr> <td>+</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> </tr> <tr> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> </tr> <tr> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> <td>9</td> </tr> <tr> <td>4</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> <td>9</td> <td>10</td> </tr> <tr> <td>5</td> <td>6</td> <td>7</td> <td>8</td> <td>9</td> <td>10</td> <td>11</td> </tr> <tr> <td>6</td> <td>7</td> <td>8</td> <td>9</td> <td>10</td> <td>11</td> <td>12</td> </tr> </table>	+	1	2	3	4	5	6	1	2	3	4	5	6	7	2	3	4	5	6	7	8	3	4	5	6	7	8	9	4	5	6	7	8	9	10	5	6	7	8	9	10	11	6	7	8	9	10	11	12
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10. Sample	<p>A <b>sample</b> is a small selection of items from a population.</p> <p>A sample is <b>biased</b> if individuals or groups from the population are not represented in the sample.</p>	A sample could be selecting 10 students from a year group at school.																																																	
11. Sample Size	The larger a sample size, the closer those probabilities will be to the true probability.	A sample size of 100 gives a more reliable result than a sample size of 10.																																																	