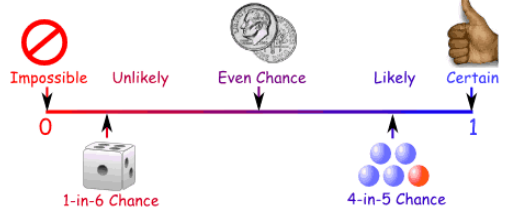
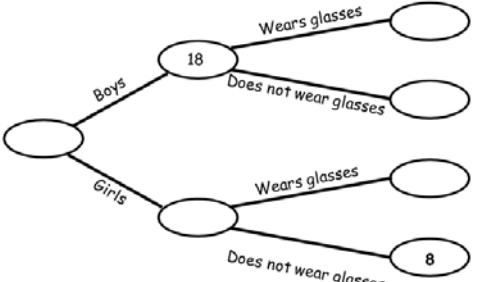


## Topic: Basic Probability

| 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    | <p><b>P(A)</b> refers to the <b>probability that event A will occur</b>.</p>   | <p>P(Red Queen) refers to the probability of picking a Red Queen from a pack of cards.</p>  |
| 3. Theoretical Probability | <p style="text-align: center;"><b><i>Number of Favourable Outcomes</i></b><br/><b><i>—————</i></b><br/><b><i>Total Number of Possible Outcomes</i></b></p>   | <p>Probability of rolling a 4 on a fair 6-sided die = <math>\frac{1}{6}</math>.</p>   |
| 4. Relative Frequency      | <p style="text-align: center;"><b><i>Number of Successful Trials</i></b><br/><b><i>—————</i></b><br/><b><i>Total Number of Trials</i></b></p>  | <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       | <p>To find the number of expected outcomes, <b>multiply the probability by the number of trials</b>.</p>   | <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>   | <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.</p>   |
| 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 |
| +               | 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 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |   |    |    |   |   |   |   |    |    |    |
| 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.   |   |    |    |    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |   |   |   |   |   |    |    |   |   |   |   |    |    |    |