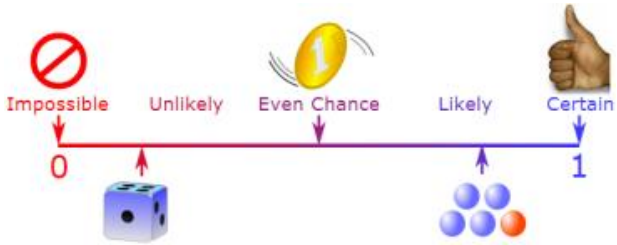
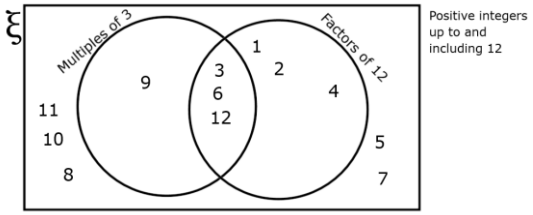
Probability – Knowledge Organiser

Objective
Know and use the language associated with probability and the 0-1 scale to measure probability as fractions and decimals
Work out probabilities for events with fair and biased outcomes
Use sample space and Venn diagrams to sort information and calculate probabilities
List all the outcomes for an experiment to evaluate probabilities



Key Facts

Use Venn diagrams to calculate probability.



For sets A and B:

$A \cup B$ *means all elements in A and B*

$A \cap B$ *means everything in both A and B*

ξ *means the everything in the set*

A'*means not in A*

$\in$ *Means an element of*

$\subset$ *means a subset of*

Combined events are often shown with a **list of outcomes**, or when two events, a **sample space diagram**

The notation P(E) is the probability of event E.

Theoretical probability P(E)

$$= \frac{\text{number of outcomes favourable to the event E}}{\text{number of outcomes in the sample space S}}$$

Experimental probability/Relative frequency

$$= \frac{\text{number of times the event occurs}}{\text{total number of trials in the experiment}}$$

As the number of trials increases, experimental probability gets closer to theoretical probability

If A and B are mutually exclusive events:
P(A or B) = P(A) + P(B)
P(A and B) = 0

Key Concept Check

Which of the following could be probabilities of events? 1:6 $\frac{3}{4}$ 1.4 0.35 2 to 5

If you flip a fair coin 3 times and get a head, it is more likely you get a head next time. Comment?

Something happening or not happening each has a probability of ½. Comment?

What is the probability of rolling a six twice with dice? $\frac{2}{6}$ $\frac{1}{36}$ $\frac{2}{36}$ $\frac{2}{12}$

Key words used in this unit:

Probability – measure of how likely/chance that an outcome of an event is to occur.

Event – something that takes place or is expected to happen

Mutually exclusive – events that cannot occur at the same time

Outcome – possible result of an experiment or trial

Exhaustive – all possible outcomes of an event

Random – process of selection where each item has an equal chance of being chosen

Fair - an equal chance of an outcome occurring

Bias - a particular outcome happening more or less frequently

Sample space – all the outcomes of events such as throwing a coin and die or of experiments, often shown in a diagram

Theoretical probability – the expected probability of an event happening

Experimental probability/Relative frequency – an estimate of probability from experiments / trials

Venn diagram – diagram that shows the relationship between sets