

Add, Subtract and multiply fractions

Addition and Subtraction

$\frac{4}{5} - \frac{2}{3}$

$\frac{12}{15} - \frac{10}{15} = \frac{2}{15}$

Use equivalent fractions to find a common multiple for both denominators

Multiplication

$\frac{3}{4} \times \frac{2}{3}$

Modelled: $\frac{3}{4} \times \frac{2}{3} = \frac{6}{12}$

Parts shaded

Total number of parts in the diagram



The probability scale

Impossible 0 or 0%

Even chance 0.5, $\frac{1}{2}$ or 50%

Certain 1 or 100%

The more likely an event the further up the probability it will be in comparison to another event (it will have a probability closer to 1)

There are 2 pink and 2 yellow balls, so they have the same probability

There are 5 possible outcomes So 5 intervals on this scale, each interval value is $\frac{1}{5}$

Probability of a single event

Probability = $\frac{\text{number of times event happens}}{\text{total number of possible outcomes}}$

$P(\text{Blue}) = \frac{4}{10} = \frac{2}{5}$

There are 4 blue sectors

There are 10 sectors overall

Probability notation P (event)

Probability can be a fraction, decimal or percentage value

$\frac{4}{10} = \frac{40}{100} = 0.40 = 40\%$

Probability is always a value between 0 and 1

Sum of probabilities

Probability is always a value between 0 and 1

The probability of getting a blue ball is $\frac{1}{5}$

\therefore The probability of NOT getting a blue ball is $\frac{4}{5}$

The sum of the probabilities is 1

The table shows the probability of selecting a type of chocolate

Dark	Milk	White
0.15	0.35	

$P(\text{white chocolate}) = 1 - 0.15 - 0.35 = 0.5$

Frequency trees

60 people visited the zoo one Saturday morning

26 of them were adults. 13 of the adult's favourite animal was an elephant. 24 of the children's favourite animal was an elephant

The overall total "60 people"

A frequency tree is made up from part-whole models. One piece of information leads to another

Probabilities or statements can be taken from the completed trees e.g. 34 children visited the zoo

Expected outcomes

Expected outcomes are estimations. It is a long term average rather than a prediction

Dark	Milk	White
0.15	0.35	0.5

The sum of the probabilities is 1

On an experiment is carried out 400 times. Show that dark chocolate is expected to be selected 60 times

$0.15 \times 400 = 60$

Independent events

The rolling of one dice has no impact on the rolling of the other. The individual probabilities should be calculated separately.

Probability of event 1 \times Probability of event 2

$P(5) = \frac{1}{6}$ $P(R) = \frac{1}{4}$

Find the probability of getting a 5 and a red

$P(5 \text{ and } R) = \frac{1}{6} \times \frac{1}{4} = \frac{1}{24}$

Probability from sample space

The possible outcomes from rolling a dice

	1	2	3	4	5	6
H	1H	2H	3H	4H	5H	6H
T	1T	2T	3T	4T	5T	6T

This is the set notation that represents the question P

What is the probability that an outcome has an even number and a tails?

$P(\text{Even number and Tails}) = \frac{3}{12}$

Numerator: the event

Denominator: the total number of outcomes

There are three even numbers with tails

There are twelve possible outcomes

In between the () is the event asked for



Probability from two-way tables

	Car	Bus	Wak	Total
Boys	15	24	14	53
Girls	6	20	21	47
Total	21	44	35	100

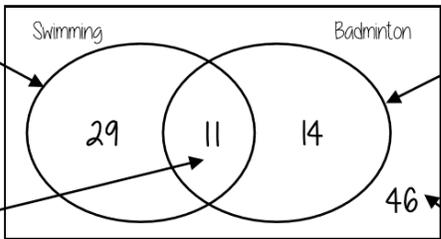
$P(\text{Girl walk to school}) = \frac{21}{100}$

The event (points to 21)
The total in the set (points to 100)
The total number of items (points to 100)

Probability from Venn diagrams

100 students were questioned if they played badminton or went to swimming club
40 went swimming, 25 went to badminton and 11 went to both

This whole curve includes everyone that went swimming
Because 11 did both we calculate just swimming by 40-11



This whole curve includes everyone that went to badminton
Because 11 did both we calculate just badminton by 25-11

$P(\text{Just swimming}) = \frac{29}{100}$

The number outside represents those that did neither badminton or swimming
 $100 - 29 - 11 - 14$

The intersection represents both Swimming AND badminton

Listing outcomes

Starter	Main
Soup Bread	Chicken Beef Pizza

When listing outcomes we must do it systematically. Start with all the options with one of the starters:

- Soup, chicken
- Soup, Beef
- Soup, Pizza
- Bread, Chicken
- Bread, Beef
- Bread, Pizza

This will mean you get all possible outcomes and don't miss any.

Relative Frequency

$$\frac{\text{Frequency of event}}{\text{Total number of outcomes}}$$

Remember to calculate or identify the overall number of outcomes!

Colour	Frequency	Relative Frequency
Green	6	0.3
Yellow	12	0.6
Blue	2	0.1
	20	

Relative frequency can be used to find expected outcomes

e.g Use the relative probability to find the expected outcome for green if there are 100 selections.

Relative frequency x Number of times
 $0.3 \times 100 = 30$

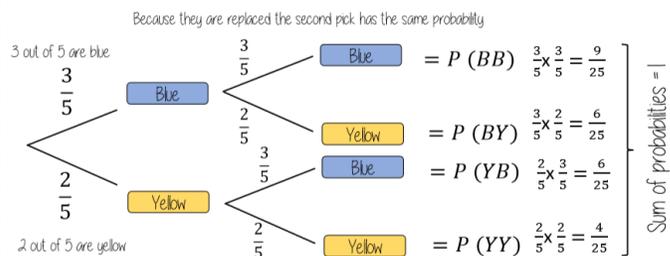
Independent events

The outcome of two events happening The outcome of the first event has no bearing on the outcome of the other

$P(A \text{ and } B) = P(A) \times P(B)$

Tree diagram for independent event

Isobel has a bag with 3 blue counters and 2 yellow. She picks a counter and replaces it before the second pick

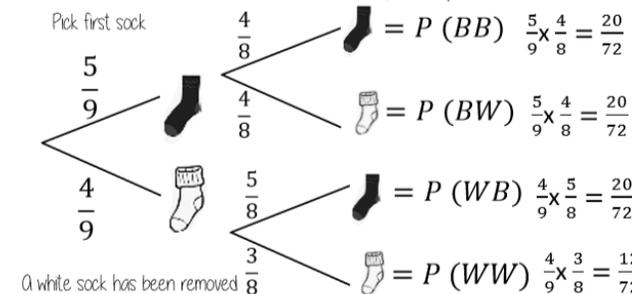


Dependent events

The outcome of the first event has an impact on the second event

Tree diagram for dependent event

A sock drawer has 5 black and 4 white socks, Jamie picks 2 socks from the drawer.



NOTE: as "socks" are removed from the drawer the number of items in that drawer is also reduced ∴ the denominator is also reduced for the second pick.

