

## Probability

Decimal	Fraction	Percentage	What is the probability (chance)?
0	0	0%	No chance whatever of it happening
0.25	$\frac{1}{4}$	25%	Not very likely to happen
0.5	$\frac{1}{2}$	50%	Just as likely that it will or will not happen
0.75	$\frac{3}{4}$	75%	Quite likely to happen
1	1	100%	It will definitely happen

### Equal Probability:

Example	Number of sides	Chance	Probability
Tossing a coin	2 sides	1 in 2 chance of getting a head	$\frac{1}{2}$
		1 in 2 chance of getting a tail	$\frac{1}{2}$
Throwing a dice	6 sides	1 in 6 chance of throwing a 1	$\frac{1}{6}$
		1 in 6 chance of throwing a 2	$\frac{1}{6}$
		1 in 6 chance of throwing a 3	$\frac{1}{6}$
		1 in 6 chance of throwing a 4	$\frac{1}{6}$
		1 in 6 chance of throwing a 5	$\frac{1}{6}$
		1 in 6 chance of throwing a 6	$\frac{1}{6}$

**Unequal Probability:**

Used when the chances of getting a particular outcome can not be compared to getting a different outcome e.g. when different numbers / quantities are involved.

Example	Number / quantity	Chance of it happening?	Probability
Picking a chocolate with a fruit centre from a box of chocolates	6 nut centres	Number of fruit centres: 5	<b>0.35</b>
	3 caramel centres	Total chocolates: 14	<b>35%</b>
	5 fruit centres	Chance = $5/14$	<b>5/14</b>
	<u>Each quantity is different</u> so the chances of picking one over the another is <u>not equal</u>	$0.3515$ $14 \overline{) 5.5080^{20}0}$	
<p><b>Remember:</b>                      If it's definitely going to happen the probability is 1.                      We know the chance of it happening is <b>0.35</b> so the chance of it not happening is what's left.</p>		<b>Chance of it <u>not</u> happening?</b>	<b>Probability of it <u>not</u> happening?</b>
		$1 - 0.35 = 0.65$	<b>0.65</b> <b>65%</b>

Note: in the above example of 5/14, 5 is a prime number so this fraction will not cancel down. Fractions should be cancelled down where appropriate.

### Listing all outcomes:

Used when two events occur at the same time.

Example:

There are two boxes of chocolates, one containing 9 chocolates with 3 different centres (3 x nutty, 3 x fruit, 3 x caramel) and one containing chocolates with 3 different coloured wrappers (3 x red, 3 x blue, 3 x yellow). When picking one from each box, what are the chances of picking a nutty centre and a red wrapper?

### The Rules:

1. **List** out all the possible combinations:

Nutty centre, red	Caramel centre, red	Fruit centre, red
Nutty centre, blue	Caramel centre, blue	Fruit centre, blue
Nutty centre, yellow	Caramel centre, yellow	Fruit centre, yellow

2. **Count** up the different number of combinations.

There are 9 in the above example so the **chance** of picking any one of those is **1 in 9**

Probability			Probability of it not happening?
Fraction	Decimal	Percentage	
$\frac{1}{9}$	0.11	11%	$1 - 0.11 = 0.89$