

## Square Numbers

$$1^2 = 1$$

$$2^2 = 4$$

$$3^2 = 9$$

$$4^2 = 16$$

$$5^2 = 25$$

$$6^2 = 36$$

$$7^2 = 49$$

$$8^2 = 64$$

$$9^2 = 81$$

$$10^2 = 100$$

$$11^2 = 121$$

$$12^2 = 144$$

## Probability

An **event** is a possible outcome of a trial.

A **trial** is an experiment.

E.g. Spinning a coin is a **trial**. Getting a head on a coin is an **event**.

**Probability** is the likelihood (chance) of an event happening.

**Theoretical probability** is the calculated probability of an event happening e.g. the probability of getting a heads when flipping a coin is  $\frac{1}{2}$ .

**Relative frequency** is how often something happens divided by number of trials.

E.g. If a coin was flipped a hundred times and got heads 59 times, then the **relative frequency** of flipping heads would be  $\frac{59}{100}$  (or 0.59 or 59%).

**Dependant events** are affected by previous events.

E.g. If you draw a coloured marble from a bag and then leave it out, then the probabilities of drawing each colour next time will be different.

**Independent events** are not affected by previous events.

**Mutually exclusive** events can't happen at the same time.

## Standard Form

**Standard form** is a way of writing really big and really small numbers in the form  $x \times 10^n$  where  $x$  is between 1 and 10.

E.g. 8,000 can be written as  $8 \times 10^3$

**Scientific Notation** is another word for Standard form. Standard form is used regularly in science to represent numbers e.g. the distance from Earth to sun is  $1.5 \times 10^8$  km.

The diameter of a Hydrogen atom is  $2.5 \times 10^{-11}$  m.

**Ordinary Numbers** are not written in standard form.

E.g.  $9.4 \times 10^5$  as an ordinary number is 940,000.

## Indices

One meaning for the word '**index**' is that it tells you how many times to use a number in a multiplication.

E.g.  $y^4$  means  $y \times y \times y \times y$ .

We say  $y^4$  as "y to the power of 4"

**Indices** is the plural of index.

**Exponent** is another word for index.

The **base** is the number that index applies to.

**Product of prime factors** can be written in **index form**  
e.g.  $24 = 2^3 \times 3$

**Prime numbers** have exactly 2 factors – itself and 1.

**Product** is the result of multiplying two or more numbers.

## Algebraic Representations

**Expression** contains terms that are made up of numbers, letters and operators.

E.g.  $7+3$ ,  $a^2+b^2$

**Equation** is a statement that two things are equal, it contains expressions on both sides of the equal sign. E.g.  $5=2x+1$

**Identity** is an equation that holds true for all values of the variable. The symbol is  $\equiv$   
E.g.  $2x + 3x \equiv 5x$

**Inequality** is a statement that two things are not equal. They use these symbols:  
 < less than       $\leq$  less than or equal to  
 > more than       $\geq$  greater than or equal to

**Binomial** is the sum or difference of two terms e.g.  $(x+5)$ .

**Terms** are either a single number or variable, or numbers and variables multiplied together.  
E.g.  $5$ ,  $b$ ,  $-4c$ ,  $3a^2$

**Coefficient** is a number that is multiplying a variable.  
E.g.  $4y$  means "4 lots of  $y$ " so 4 is the coefficient of  $y$ .

**Quadratic** expressions have the highest power of a variable of 2.  
E.g.  $3x^2 + 5x$ ,  $x^2 + 5x + 6$

## Important Formulae

### Areas

Rectangle =  $base \times height$

Triangle =  $\frac{1}{2} \times base \times height$

Parallelogram =  $base \times perpendicular\ height$

Trapezium =  $\frac{1}{2}(a + b)h$

### Circles

Area =  $\pi r^2$

Circumference =  $\pi d$

### Angles in Polygons

Sum of interior angles =  $180(n - 2)$

Each exterior angle in a regular polygon =  $\frac{360}{n}$

Interior angle + exterior angle =  $180^\circ$

### Pythagoras' theorem

$$a^2 + b^2 = c^2$$



## Trinity TV

For more help, visit Trinity TV and watch the following videos:

Trinity TV > Maths > Year 9 > Term 6