1) Square Numbers

$1^2 = 1$

$2^2 = 4$

$3^2 = 9$

$4^2 = 16$

$5^2 = 25$

$6^2 = 36$

$7^2 = 49$

$8^2 = 64$

$9^2 = 81$

$10^2 = 100$

$11^2 = 121$
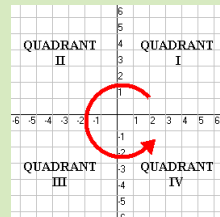
$12^2 = 144$

2) Graphs

Cartesian co-ordinates use an ordered pair of values (x,y) to define the position of a point.

Quadrants are the four regions separated by the x and y axis.

The **x - coordinate** is the first number in a coordinate and is the horizontal value.

The **y – coordinate** is the second number in a coordinate and is the vertical value.

The **origin** is the name given to the coordinate (0,0).

Horizontal lines go in a left-right direction. Their equations are in the form **y=n**

Vertical lines go in an up-down direction. Their equations are in the form **x=n**

Vertical and **horizontal** lines are perpendicular to each other.

3) Straight Line Graphs

A **linear graph** produces a continuous straight line.

A **non-linear** graph does not produce a continuous straight line.

$y = x^2$ is an example of a **non-linear** graph.

Linear graphs are often written as equations in the form **y = mx + c** where m is the gradient and c is the y intercept
e.g. y = 3x + 7 has a gradient of 3 and crosses the y-axis at 7

The **y-intercept** is where a line crosses the y – axis.

Gradient is the **steepness** of a line.

Lines are **parallel** if they have the same **gradient.**

e.g. y=3x+4 and y=3x-2 are parallel

A linear sequences that is **ascending** has a positive gradient when plotted.

A linear sequences that is **descending** has a negative gradient when plotted.

4) Equations and Inequalities 1

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

Solve equations by finding the value of the unknown
e.g. solve x + 5 = 8   answer x = 3
In the above example x = 3 is the **solution** (answer).

Use **inverse operations** to solve equations.
E.g. the inverse of addition is subtraction;
the inverse of multiplication is division.

Inequality is a statement that two things are **not equal**.
We use the following symbols:

≠ not equal
< less than
> more than
≤ less than or equal to
≥ greater than or equal to

A **solution set** contains all values that work as solutions to an equation or inequality.

5) Equations and Inequalities 2

A **formula** is a rule or relationship that is written with mathematical symbols e.g. $f = ma$

The plural of formula is **formulae.**

The **subject of a formula** is the single variable that is equal to everything else.
The example above has f as the subject.

We can change the subject of a formula by **rearranging** it.
This is done using inverse operations.

Substitute is where we replace a letter with a number.

Evaluate means to calculate the value of something.
e.g. Evaluate 5y when y = 7.
    Answer: 5 x 7 = 35

6) Types of Numbers

The **factors** of a number are the numbers that divide into it without leaving any remainders. E.g. factors of 24 are 1, 2, 3, 4, 6, 8, 12, 24.

Highest common factor (HCF) is the greatest number that is a factor of two or more numbers.

Multiples of a number are found by multiplying that number by integers.

e.g. the multiples of 4 are 4, 8, 12, 16….

Lowest common multiple (LCM) is the lowest number that is a multiple of two or more numbers.

Prime numbers have exactly 2 factors – itself and 1.

1 is not a prime number as it only has one factor.

Even numbers are divisible by 2.

Even numbers are written algebraically as $2n.$

Odd numbers leave a remainder of 1 when they are divided by 2.

Odd numbers are written algebraically as $2n + 1.$