Mathematics	Reasoning with Algebra		Year 9	Term 1

1. Square Numbers

$1^2 = 1$ $7^2 = 49$

$2^2 = 4$ $8^2 = 64$

$3^2 = 9$ $9^2 = 81$

$4^2 = 16$ $10^2 = 100$

$5^2 = 25$ $11^2 = 121$

$6^2 = 36$ $12^2 = 144$

2. Graphs

Cartesian co-ordinates - the ordered pair of (x,y) to define a point in a quadrant

Quadrant - One of four regions separated by the x and y axis.

x - coordinate – The first number given in a coordinate which is the horizontal value

y - coordinate – The second number given in a coordinate which is the vertical value

Horizontal—parallel to the horizon

Horizontal graphs are in the form y = n

Vertical – at right angles to horizontal plane

Vertical graphs are in the form x = n

Origin—A fixed point at which measurements are taken from. This is usually (0,0)

3. Straight Line Graphs

y-intercept – Where a line crosses the y – axis

Linear graph – produces a continuous straight line

$y = $**m**$x + $**c** – This is often the form of a linear graph where **m** is the gradient and **c** is the y intercept

When we talk about the **steepness** of a line we are referring to its gradient

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

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

A linear sequence that is **ascending** results in a positive gradient

A linear sequence that is **descending** results in a negative gradient

Non Linear graph - does not produce a continuous straight line

*y = x² is an example of a **non linear** graph*

4. Equations and Inequalities 1

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

Solution – the answer when you solve an equation

Inverse operations - used to solve equations. Addition and subtraction, multiplication and division are inverse operations.

Inequality - when one quantity is not equal to another. We use the following symbols:

≠ not equal   ≤ less than or equal to

< less than   ≥ greater than or
> more than   equal to

Solution set - a set of all the solutions to an equation

5. Equations and Inequalities 2

Formula - a mathematical rule expressed with symbols
e.g. f = ma

The plural of formula is **formulae**

Subject of a formula - the single variable that is equal to everything else
In the example above force is the subject

We can **re-arrange** a formula to change the subject of it. This is done using inverse operations.

Substitute - where we replace a letter with a number.

Evaluate - to calculate the value of.
e.g. if y = 7 evaluate 5y . Answer 5 x 7 = 35

6. Types of Numbers

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

Multiples of a number are found by multiplying that number by an integer.

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

Lowest common multiple (LCM) - the common multiple of two or more numbers which has the least value.

Prime numbers - have exactly 2 factors – itself and one

One is not a prime number as it only has 1 factor

Even numbers - any number that is 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 $2n + 1$