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| **H Unit 2: Algebra** | **Road Map** | | | | | |
| In this unit you will learn about number. The aims are as follows:  **LG1**: Knowledge  **LG2**: Application  **LG3**: Skills | Assessment Grades |  |  | | | |
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| **Themes** | **Learning Goals/Outcomes/Content** | | |  |  |  |
| 2a Algebra: The basics | Use algebraic notation and symbols correctly; | | |  |  |  |
| Write an expression; | | |  |  |  |
| Know the difference between a term, expression, equation, formula and an identity; | | |  |  |  |
| Manipulate an expression by collecting like terms; | | |  |  |  |
| Substitute positive and negative numbers into expressions such as 3*x* + 4 and 2*x*3 and then into expressions involving brackets and powers; | | |  |  |  |
| Substitute numbers into formulae from mathematics and other subject using simple linear formulae, e.g. *l* × *w*, *v* = *u* + *at*; | | |  |  |  |
| Simplify expressions by cancelling, e.g.  = 2*x* | | |  |  |  |
| Use instances of index laws for positive integer powers; | | |  |  |  |
| Use index notation (positive powers) when multiplying or dividing algebraic terms; | | |  |  |  |
| Use instances of index laws, including use of zero, fractional and negative powers; | | |  |  |  |
| Multiply a single term over a bracket; | | |  |  |  |
| Recognise factors of algebraic terms involving single brackets and simplify expressions by factorising, including subsequently collecting like terms; | | |  |  |  |
| Expand the product of two linear expressions, i.e. double brackets working up to negatives in both brackets and also similar to (2*x* + 3*y*)(3*x* – *y*); | | |  |  |  |
| Know that squaring a linear expression is the same as expanding double brackets; | | |  |  |  |
| Factorise quadratic expressions of the form *ax*2 + *bx* + *c*; | | |  |  |  |
| Factorise quadratic expressions using the difference of two squares. | | |  |  |  |
| 2b Setting up, rearranging and solving equations | Set up simple equations from word problems and derive simple formulae; | | |  |  |  |
| Understand the ≠ symbol (not equal), e.g. 6*x* + 4 ≠ 3(*x* + 2), and introduce identity ≡ sign; | | |  |  |  |
| Solve linear equations, with integer coefficients, in which the unknown appears on either side or on both sides of the equation; | | |  |  |  |
| Solve linear equations which contain brackets, including those that have negative signs occurring anywhere in the equation, and those with a negative solution; | | |  |  |  |
| Solve linear equations in one unknown, with integer or fractional coefficients; | | |  |  |  |
| Set up and solve linear equations to solve to solve a problem; | | |  |  |  |
| Derive a formula and set up simple equations from word problems, then solve these equations, interpreting the solution in the context of the problem; | | |  |  |  |
| Substitute positive and negative numbers into a formula, solve the resulting equation including brackets, powers or standard form; | | |  |  |  |
| Use and substitute formulae from mathematics and other subjects, including the kinematics formulae *v* = *u* + *at*, *v*2 – *u*2 = 2*as*, and *s* = *ut* +  *at*2; | | |  |  |  |
| Change the subject of a simple formula, i.e. linear one-step, such as *x* = 4*y*; | | |  |  |  |
| Change the subject of a formula, including cases where the subject is on both sides of the original formula, or involving fractions and small powers of the subject; | | |  |  |  |
| Simple proofs and use of ≡ in “show that” style questions; know the difference between an equation and an identity; | | |  |  |  |
| Use iteration to find approximate solutions to equations, for simple equations in the first instance, then quadratic and cubic equations. | | |  |  |  |
| 2c Sequences | Recognise simple sequences including at the most basic level odd, even, triangular, square and cube numbers and Fibonacci-type sequences; | | |  |  |  |
| Generate sequences of numbers, squared integers and sequences derived from diagrams; | | |  |  |  |
| Describe in words a term-to-term sequence and identify which terms cannot be in a sequence; | | |  |  |  |
| Generate specific terms in a sequence using the position-to-term rule and term-to-term rule; | | |  |  |  |
| Find and use (to generate terms) the *n*th term of an arithmetic sequence; | | |  |  |  |
| Use the *n*th term of an arithmetic sequence to decide if a given number is a term in the sequence, or find the first term above or below a given number; | | |  |  |  |
| Identify which terms cannot be in a sequence by finding the *n*th term; | | |  |  |  |
| Continue a quadratic sequence and use the *n*th term to generate terms; | | |  |  |  |
| Find the *n*th term of quadratic sequences; | | |  |  |  |
| Distinguish between arithmetic and geometric sequences; | | |  |  |  |
| Use finite/infinite and ascending/descending to describe sequences; | | |  |  |  |
| Recognise and use simple geometric progressions (*rn* where *n* is an integer, and *r* is a rational number > 0 or a surd); | | |  |  |  |
| Continue geometric progression and find term to term rule, including negative, fraction and decimal terms; | | |  |  |  |
| Solve problems involving sequences from real life situations. | | |  |  |  |

**Links:**

LG1: You will use the algebraic processes from this topic in all future algebra topics.

LG2: You will apply the algebraic processes from this topic to model written and geometric problems using algebra.

LG3: You will use your problem-solving skills and mastery of algebra to solve complex Mathematical problems such as problems to do with formulae used in real-life.