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| **Year 1 pure unit 1: Algebra and functions (part 1)** | **Road Map** |
| In this unit you will learn about pure mathematics. The aims are as follows:**LG1**: Knowledge**LG2**: Application**LG3**: Skills | Assessment Grades |  |  |
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| **Themes** | **Learning Goals/Outcomes/Content** |  |  |  |
| **1a. Algebraic expressions: basic algebraic manipulation, indices and surds** | be able to perform essential algebraic manipulations, such as expanding brackets, collecting like terms, factorising etc; |  |  |  |
| understand and be able to use the laws of indices for all rational exponents; |  |  |  |
| be able to use and manipulate surds, including rationalising the denominator. |  |  |  |
| **1b. Quadratic functions: factorising, solving, graphs and discriminants** | be able to solve a quadratic equation by factorising; |  |  |  |
| be able to work with quadratic functions and their graphs; |  |  |  |
| know and be able to use the discriminant of a quadratic function, including the conditions for real and repeated roots; |  |  |  |
| be able to complete the square. e.g. $ax^{2}+bx+c=a\left(x+\frac{b}{2a}\right)^{2}+\left(c-\frac{b^{2}}{4a}\right)$; |  |  |  |
| be able to solve quadratic equations, including in a function of the unknown. |  |  |  |
| **1c. Equations: quadratic/linear simultaneous** | be able to solve linear simultaneous equations using elimination and substitution; |  |  |  |
| be able to use substitution to solve simultaneous equations where one equation is linear and the other quadratic. |  |  |  |

**Links:**

LG1: You will become fluent in algebraic manipulation, including manipulation of brackets, indices and surds. You should become proficient in solving equations including quadratic and simultaneous equations. You need to know several methods for working with quadratics and know how to calculate a discriminant.

LG2: You will learn how to apply your knowledge to make sense of the links between a quadratic equation written in its different forms, and the resulting graph in order to sketch quadratic graphs and find turning points. You will be able to apply your knowledge of the discriminant to make deductions about a quadratic function and its graph.

LG3: You will be able to solve a variety of routine and non-routine problems, by combining several Mathematical skill sets. For example, deducing a range of values in which a constant can lie, given information about the number of roots of an equation, using the discriminant and by forming and solving a quadratic inequality.