Algebra in the Syllabus

Topic	Description of topic *Students learn about*	Learning outcomes *Students should be able to*
4.1 Generating arithmetic expressions from repeating patterns	Patterns and the rules that govern them, and so construct an understanding of a relationship as that which involves a set of inputs, a set of outputs and a correspondence from each input to each output.	– use tables to represent a repeating-pattern situation – generalise and explain patterns and relationships in words and numbers – write arithmetic expressions for particular terms in a sequence

Topic	Description of topic *Students learn about*	Learning outcomes *Students should be able to*
4.2 Representing situations with tables, diagrams and graphs	Relations derived from some kind of context – familiar, everyday situations, imaginary contexts or arrangements of tiles or blocks. They look at various patterns and make predictions about what comes next.	– use tables, diagrams and graphs as tools for representing and analysing linear, quadratic and exponential patterns and relations (exponential relations limited to doubling and tripling) – develop and use their own generalising strategies and ideas and consider those of others – present and interpret solutions, explaining and justifying methods, inferences and reasoning

Topic	Description of topic *Students learn about*	Learning outcomes *Students should be able to*
4.3 Finding Formulae	Ways to express a general relationship arising from a pattern or context.	– find the underlying formula written in words from which the data is derived (linear relations) – **find the underlying formula algebraically from which the data is derived (linear, quadratic relations)**

Topic	Description of topic *Students learn about*	Learning outcomes *Students should be able to*
4.4 Examining algebraic relationships	Features of a relationship and how these features appear in the different representations Constant rate of change: linear relationships. Non-constant rate of change: quadratic relationships Proportional relationships	– show that relations have features that can be represented in a variety of ways – distinguish those features that are especially useful to identify and point out how those features appear in different representations: in tables, graphs, physical models, and formulas expressed in words, and algebraically – use the representations to reason about the situation from which the relationship is derived and communicate their thinking to others – recognise that a distinguishing feature of quadratic relations is the way change varies – discuss rate of change and the y-intercept, consider how these relate to the context from which the relationship is derived, and identify how they can appear in a table, in a graph and in a formula – decide if two linear relations have a common value (decide if two lines intersect and where the intersection occurs) – investigate relations of the form y=mx and y=mx +c recognise problems involving direct proportion and identify the necessary information to solve them

Topic	Description of topic *Students learn about*	Learning outcomes *Students should be able to*
4.5 Relations without Formulae	Using graphs to represent phenomena quantitatively.	– explore graphs of motion – make sense of quantitative graphs and draw conclusions from them – make connections between the shape of a graph and the story of a phenomenon – describe both quantity and change of quantity on a graph
4.6 Expressions	Using letters to represent quantities that are variable. Arithmetic operations on expressions; applications to real life contexts. Transformational activities: collecting like terms, simplifying expressions, substituting, expanding and factoring.	– evaluate expressions of the form • $ax + by$ • $a(x + y)$ • $x^2 + bx + c$ • $\frac{ax + by}{cx + dy}$ • axy where $a, b, c, d, x, y \in \mathbb{Z}$ • $ax^2 + bx + c$ • $x^3 + bx^2 + cx + d$ where $a, b, c, d, x, y \in \mathbb{Q}$