Achievement objectives

Level 6	Level 7	Level 8
In a range of meaningful contexts, students will be engaged in thinking mathematically and statistically. They will solve problems and model situations that require them to:		
NA6-1 Apply direct and inverse relationships with linear proportions.	M7-1 Apply co-ordinate geometry techniques to points and lines.	M8-1 Apply the geometry of conic sections.
NA6-2 Extend powers to include integers and fractions.	M7-2 Display the graphs of linear and non-linear functions and connect the structure of the functions with their graphs.	M8-2 Display and interpret the graphs of functions with the graphs of their inverse and/or reciprocal functions.
NA6-3 Apply everyday compounding rates.	M7-3 Use arithmetic and geometric sequences and series.	M8-3 Use permutations and combinations.
NA6-4 Find optimal solutions, using numerical approaches.	M7-4 Apply trigonometric relationships, including the sine and cosine rules, in two and three dimensions.	M8-4 Use curve fitting, log modelling, and linear programming techniques.
NA6-5 Form and solve linear equations and inequations, quadratic and simple exponential equations, and simultaneous equations with two unknowns.	M7-5 Choose appropriate networks to find optimal solutions.	M8-5 Develop network diagrams to find optimal solutions, including critical paths.
NA6-6 Generalise the properties of operations with rational numbers, including the properties of exponents.	M7-6 Manipulate rational, exponential, and logarithmic algebraic expressions.	M8-6 Manipulate trigonometric expressions.
NA6-7 Relate graphs, tables, and equations to linear, quadratic, and simple exponential relationships found in number and spatial patterns	M7-7 Form and use linear, quadratic, and simple trigonometric equations.	M8-7 Form and use trigonometric, polynomial, and other non-linear equations.
NA6-8 Relate rate of change to the gradient of a graph.	M7-8 Form and use pairs of simultaneous equations, one of which may be non-linear.	M8-8 Form and use systems of simultaneous equations, including three linear equations and three variables, and interpret the solutions in context.
GM6-1 Measure at a level of precision appropriate to the task.	M7-9 Sketch the graphs of functions and their gradient functions and describe the relationship between these graphs	M8-9 Manipulate complex numbers and present them graphically.

GM6-2 Apply the relationships between units in the metric system, including the units for measuring different attributes and	M7-10 Apply differentiation and anti-differentiation techniques to polynomials.	M8-10 Identify discontinuities and limits of functions.
GM6-3 Calculate volumes, including prisms, pyramids, cones, and spheres, using formulae.		M8-11 Choose and apply a variety of differentiation, integration, and anti-differentiation techniques to functions and relations, using both analytical and numerical methods.
GM6-4 Deduce and apply the angle properties related to circles.		M8-12 Form differential equations and interpret the solutions.
GM6-5 Recognise when shapes are similar and use proportional reasoning to find an unknown length.		
GM6-6 Use trigonometric ratios and Pythagoras' theorem in two and three dimensions.		
GM6-7 Use a co-ordinate plane or map to show points in common and areas contained by two or more		
GM6-8 Compare and apply single and multiple transformations.		
GM6-9 Analyse symmetrical patterns by the transformations used to create them		

S6-1 Plan and conduct investigations using the statistical enquiry cycle: A justifying the variables and measures used B managing sources of variation, including through the use of random sampling C identifying and communicating features in context (trends, relationships between variables, and differences within and between distributions), using multiple displays D making informal inferences about populations from sample data E justifying findings, using displays and measures.	S7-1 Carry out investigations of phenomena, using the statistical enquiry cycle: A conducting surveys that require random sampling techniques, conducting experiments, and using existing data sets B evaluating the choice of measures for variables and the sampling and data collection methods used C using relevant contextual knowledge, exploratory data analysis, and statistical inference.	S8-1 Carry out investigations of phenomena, using the statistical enquiry cycle: A conducting experiments using experimental design principles, conducting surveys, and using existing data sets B finding, using, and assessing appropriate models (including linear regression for bivariate data and additive models for time-series data), seeking explanations, and making predictions C using informed contextual knowledge, exploratory data analysis, and statistical inference D communicating findings and evaluating all stages of the cycle.
	S7-2 Make inferences from surveys and experiments: A making informal predictions, interpolations, and extrapolations B using sample statistics to make point estimates of population parameters C recognising the effect of sample size on the variability of an estimate.	S8-2 Make inferences from surveys and experiments: A determining estimates and confidence intervals for means, proportions, and differences, recognising the relevance of the central limit theorem B using methods such as resampling or randomisation to assess
S6-2 Evaluate statistical reports in the media by relating the displays, statistics, processes, and probabilities used to the claims made.	S7-3 Evaluate statistically based reports: A interpreting risk and relative risk B identifying sampling and possible non-sampling errors in surveys, including polls.	S8-3 Evaluate a wide range of statistically based reports, including surveys and polls, experiments, and observational studies: A critiquing causal-relationship claims B interpreting margins of error.

S6-3 Investigate situations that involve elements of chance: A comparing discrete theoretical distributions and experimental distributions, appreciating the role of sample size B calculating probabilities in discrete situations.	S7-4 Investigate situations that involve elements of chance: A comparing theoretical continuous distributions, such as the normal distribution, with experimental distributions B calculating probabilities, using such tools as two-way tables, tree diagrams, simulations, and technology.	S8-4 Investigate situations that involve elements of chance: A calculating probabilities of independent, combined, and conditional events B calculating and interpreting expected values and standard deviations of discrete random variables C applying distributions such as the Poisson,