Comparison of New Zealand Mathematics and the new IB Mathematics Courses

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NZC Content (Achievement Objectives)	NZC Level (1-8)	Course	Assessed Achievement Standard (AS)	Included in Prior learning	Included in Analysis SL	Included in Analysis HL	Included in Apps SL	Included in Apps HL	Comments
e.g. Carry out investigations of phenomena, ...	8	e.g. Mathematics and Statistics 3.8	e.g. AS91580		√	√	√	√	
Carry out investigations of phenomena, using the statistical enquiry cycle: using existing data sets; finding, using, and assessing appropriate models (including additive models for **time-series data**), seeking explanations, and making predictions; using informed contextual knowledge; communicating findings and evaluating all stages of the cycle.	8	Mathematics and Statistics 3.8	AS91580						Not in IB syllabus
Carry out investigations of phenomena, using the statistical enquiry cycle: using existing data sets; finding, using, and assessing appropriate models (including linear regression for **bivariate data**), seeking explanations, and making predictions; using informed contextual knowledge and statistical inference; communicating findings and evaluating all stages of the cycle	8	Mathematics and Statistics 3.9	AS91581		√	√	√	√	
Carry out investigations of phenomena, using the statistical enquiry cycle: **using existing data sets**; seeking explanations; using informed contextual knowledge, exploratory data analysis, and statistical inference; communicating findings and evaluating all stages of the cycle	8	Mathematics and Statistics 3.10	AS91582					√*	This is embedded in much of the conceptual understanding required at the Apps AHL level
Make inferences from surveys and experiments: determining estimates and confidence intervals for differences; use methods such as resampling to assess the strength of the evidence	8	Mathematics and Statistics 3.10	AS91582				√	√	
Carry out investigations of phenomena, using the statistical enquiry cycle: **conducting experiments using experimental design principles**; seeking explanations; using informed contextual knowledge, exploratory data analysis, and statistical inference; communicating findings and evaluating all stages of the cycle	8	Mathematics and Statistics 3.11	AS91583		√	√	√	√*	This is embedded in much of the conceptual understanding required at the Apps AHL level

Make inferences from surveys and experiments: using methods such as randomisation to assess the strength of the evidence	8	Mathematics and Statistics 3.11	AS91583		√	√	√	√	
Evaluate a wide range of statistically based reports, including surveys and polls, experiments, and observational studies: critiquing causal-relationship claims; interpreting margins of error	8	Mathematics and Statistics 3.12	AS91584		√	√	√	√	
Investigate situations that involve elements of chance: calculating probabilities of independent, combined, and conditional events	8	Mathematics and Statistics 3.13	AS91585		√	√	√	√	
Investigate situations that involve elements of chance: calculating and interpreting expected values and standard deviations of discrete random variables; applying distributions such as the Poisson, binomial, and normal	8	Mathematics and Statistics 3.14	AS91586		√	√	√	√	
Form and use systems of simultaneous equations, including three linear equations and three variables, and interpret the solutions in context	8	Mathematics and Statistics 3.15	AS91587			√	√	√	
Display and interpret the graphs of functions with the graphs of their inverse and/or reciprocal functions.	8	Mathematics and Statistics	NA		√	√	√	√	
Use permutations and combinations.	8	Mathematics and Statistics	NA			√			
Use curve fitting, log modelling, and linear programming techniques.	8	Mathematics and Statistics	NA		√	√		√	

√*	partially included
√	included

* Note

A typical Mathematics with Statistics course consists of the following Assessed Achievement Standards:
AS91580 Time Series (3.8)
AS91581 Bi-variate Data (3.9)
AS91585 Probability Concepts (3.13)
AS91586 Probability Distributions (3.14)
AS91574 Linear Programming (3.2)

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e.g. Apply the geometry of conic sections	8	e.g. Mathematics and Statistics 3.1	e.g. AS91573						
Apply the geometry of conic sections	8	Mathematics and Statistics 3.1	AS91573						Not in IB syllabus
Use linear programming techniques	8	Mathematics and Statistics 3.2	AS91574						Not in IB syllabus
Manipulate trigonometric expressions	8	Mathematics and Statistics 3.3	AS91575		√	√			
Form and use trigonometric equations	8	Mathematics and Statistics 3.3	AS91575		√	√			
Develop network diagrams to find optimal solutions, including critical paths	8	Mathematics and Statistics 3.4	AS91576					√	
Manipulate complex numbers and present them graphically	8	Mathematics and Statistics 3.5	AS91577			√		√	
Form and use polynomial, and other non-linear equations	8	Mathematics and Statistics 3.5	AS91577	√*			√	√	Prior learning for Analysis HL content
Identify discontinuities and limits of functions	8	Mathematics and Statistics 3.6	AS91578		√	√	√	√	
Choose and apply a variety of differentiation techniques to functions and relations using analytical methods	8	Mathematics and Statistics 3.6	AS91578		√	√	√	√	

√*	partially included
√	included

Choose and apply a variety of integration and anti-differentiation techniques to functions and relations using both analytical and numerical methods	8	Mathematics and Statistics 3.7	AS91579		√	√	√	√	
Form differential equations and interpret the solutions	8	Mathematics and Statistics 3.7	AS91579			√		√	

* Note
A typical Mathematics with Calculus course consists of the following Assessed Achievement Standards:
AS91575 Trigonometry (3.3)
AS91587 Systems of Equations (3.15)
AS91577 Complex Numbers (3.5)
AS91578 Differentiation (3.6)
AS91579 Integration (3.7)

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e.g. apply co-ordinate geometry ...	7	Mathematics and Statistics 2.1	AS91256						
apply co-ordinate geometry techniques to points and lines	7	Mathematics and Statistics 2.1	AS91256	√					
and connect the structure of the functions with their graphs	7	Mathematics and Statistics 2.2	AS91257	√					
form and use linear, quadratic, and simple trigonometric equations	7	Mathematics and Statistics 2.2	AS91257	√					
use arithmetic and geometric sequences and series	7	Mathematics and Statistics 2.3	AS91258		√	√*	√	√*	
apply trigonometric relationships, including the sine and cosine rules, in two and three dimensions	7	Mathematics and Statistics 2.4	AS91259		√*				
choose appropriate networks to find optimal solutions	7	Mathematics and Statistics 2.5	AS91260				√*		
manipulate rational, exponential, and logarithmic algebraic expressions	7	Mathematics and Statistics 2.6	AS91261				√	√*	
form and use linear and quadratic equations	7	Mathematics and Statistics 2.6	AS91261	√					
functions and describe the relationship between these graphs	7	Mathematics and Statistics 2.7	AS91262	√					
apply differentiation and anti-differentiation techniques to polynomials	7	Mathematics and Statistics 2.7	AS91262		√	√*	√	√*	
statistical enquiry cycle: conducting surveys; evaluating the choice of measures for variables and data collection methods used; using relevant contextual knowledge	7	Mathematics and Statistics 2.8	AS91263						Not in IB Syllabus
carry out investigations of phenomena, using the statistical enquiry cycle: evaluating the choice of sampling and data collection methods used	7	Mathematics and Statistics 2.9	AS91264	√*			√		
make inferences from surveys: using sample statistics to make point estimates of population parameters; recognising the effect of sample size on the variability of an estimate	7	Mathematics and Statistics 2.9	AS91264	√					

carry out investigations of phenomena, using the statistical enquiry cycle: conducting experiments; evaluating the choice of measures for variables and data collection methods used; using relevant contextual knowledge, exploratory data analysis, and statistical inference	7	Mathematics and Statistics 2.10	AS91265	√*			√		
evaluate statistically based reports: identifying sampling and possible non-sampling errors in surveys, including polls	7	Mathematics and Statistics 2.11	AS91266				√		
evaluate statistically based reports: interpreting risk and relative risk	7	Mathematics and Statistics 2.12	AS91267				√*		In the IB Apps syllabus at a conceptual level
investigate situations that involve elements of chance: calculating probabilities, using such tools such as two-way tables, tree diagrams	7	Mathematics and Statistics 2.12	AS91267	√			√*		
investigate situations that involve elements of chance: calculating probabilities using such tools as simulations and technology.	7	Mathematics and Statistics 2.13	AS91268	√					
form and use linear and quadratic equations	7	Mathematics and Statistics 2.14	AS91269	√					
Form and use pairs of simultaneous equations, one of which may be non-linear.	7	Mathematics and Statistics	AS91269	√			√*		
Carry out investigations of phenomena, using the statistical enquiry cycle: conducting surveys that require random sampling techniques, conducting experiments, and using existing data sets; using relevant contextual knowledge, exploratory data analysis, and statistical inference.	7	Mathematics and Statistics	NA	√			√*		Normal distribution not prior knowledge
making informal predictions, interpolations, and extrapolations	7	Mathematics and Statistics	NA	√			√*		
comparing theoretical continuous distributions, such as the normal distribution, with experimental distributions;	7	Mathematics and Statistics	NA	√	√		√*		

* Note
Typical NCEA Level 2 Mathematics courses consists of the following Assessed Achievement Standards and are usually split between a foci of Statistics and Calculus:
Statistics focused course:
AS91266 Evaluate statistically based reports (2.11)
AS91264 Statistical Inference (2.9)
AS91268 Probability Simulations (2.13)
AS91267 Probability (2.12)

AS91265 Statistical Experiments (2.10)
AS91260 Networks (2.5)
Calculus focused course:
AS91257 Graphs (2.2)
AS91259 Trigonometry (2.4)
AS91261 Algebra (2.6)
AS91262 Calculus (2.7)
AS91269 Systems of Equations (2.14)