

Assessment Report

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Level 1 Mathematics and Statistics 2018

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Part A: Commentary

Teachers and candidates should be fully aware of the concepts referred to within the relevant Mathematics Assessment Specifications:

<https://www.nzqa.govt.nz/ncea/subjects/assessment-specifications/mathematics-1/>

Candidates should be guided by the number of lines provided by the examiner for a particular solution. It is generally not necessary for the student to fill up the whole blank page in presenting their solution.

Candidates need to be aware that it is highly likely that question parts follow on from each other and are linked. Therefore, a candidate should be actively looking for this connection and, if necessary, turning to earlier pages in the booklet.

Candidates who have a suitable graphical calculator, and know how to use it effectively, could be advantaged. However, it must be noted that students will be expected to demonstrate an understanding of the mathematical concepts, rather than directly transferring results from a graphical calculator. As good

mathematical practice, candidates should show intermediate steps in a logical manner and clearly communicate what is being calculated. By giving only the answer, candidates may lose the opportunity to provide evidence for grades or to have minor errors ignored and are unlikely to provide evidence towards a grade higher than Achievement.

Part B: Report on standards

91028: Investigate relationships between tables, equations and graphs

Candidates who were awarded **Achievement** commonly:

- formed a straight line equation from a graph
- correctly substituted into an exponential equation
- found the equation of a simple quadratic graph
- were not able to distinguish between a quadratic graph with a coefficient greater than 1 and an exponential graph
- were able to interpret and construct a table to help them plot a graph
- described relationships between two variables
- understood the basic concepts necessary to work with at least two different types of graphs.

Candidates whose work was assessed as **Not Achieved** commonly:

- demonstrated insufficient knowledge relevant to tables, equations, graphs
- could not find the gradient of a linear function
- could not produce a distance/time graph with an appropriate scale
- could not distinguish between graphs representing exponential equations, quadratic equations, and linear equations
- found it difficult to interpret the information provided in the questions.

Candidates who were awarded **Achievement with Merit** commonly:

- interpreted a distance/time graph and chose appropriate variables and scales for the axes
- drew an exponential graph, with an appropriate choice of scales, which included negative x-values
- formed the new equation of an exponential graph after it had been translated horizontally and vertically
- used equations to solve problems
- interpreted both linear and quadratic word problems, related to tables, equations and graphs
- plotted an appropriate graph from a table and interpreted limits appropriate to the context
- identified a relationship between variables
- confidently linked equations and tables to graphs.

Candidates who were awarded **Achievement with Excellence** commonly:

- interpreted a graph and solved the distance – speed – time word problem in Q1(b).
- found generalised equations necessary to solve word problems, using quadratic graphs and functions
- simplified exponential equations
- applied strong algebraic skills in solving the graphical problems, especially when forming equations and generalisations
- showed a confident understanding of the necessary mathematical skills of graphing, equations and tables, and were able to apply this knowledge and comprehend challenging questions

Standard specific comments

Candidates should be familiar with all three types of graph included in this Achievement Standard - linear, quadratic, and exponential. Knowledge of only linear graphs will generally not be sufficient for a candidate to achieve.

Many candidates were not familiar with distance – speed – time graphs. Some candidates found it difficult to produce the correct graph from the information

provided, and often the scale used was inappropriate or not labelled.

Candidates need to explain and justify their reasoning and show working to support their solutions.

They should be familiar with identifying the key features of a graph and be able to link tables, equations and graphs in solving problems.

91031: Apply geometric reasoning in solving problems

Candidates who were awarded **Achievement** commonly:

- applied Pythagoras' theorem
- used the trigonometric ratios in solving simple problems
- knew the basic geometrical angle rules to identify unknown angles
- identified angles on a bearing in context
- gave one geometrical reason in solving a problem
- provided geometric justification only in the diagram
- solved a geometric problem but without any geometric reasoning or with incorrect geometric reasoning.

Candidates whose work was assessed as **Not Achieved** commonly:

- could not use trigonometric ratios correctly
- were unable to use Pythagoras' theorem to find a shorter side in a triangle
- were not familiar with identifying angles on a bearing
- did not know the appropriate and relevant geometric reasons
- did not provide any geometrical reasons
- provided irrelevant information
- made incorrect assumptions from the provided information
- lacked basic geometric angle property knowledge.

Candidates who were awarded **Achievement with Merit** commonly:

- used a variety of geometrical angle rules, with justification, to calculate an unknown angle
- applied Pythagoras' Theorem to solve a problem
- applied the three trigonometric ratios to solve a problem
- solved problems that incorporated the knowledge and use of the properties of similar triangles
- used circle geometry rules to solve a problem
- made only part progress in the steps necessary in completing a geometrical proof
- produced an incomplete chain of geometrical reasoning whilst solving the extended problems.

Candidates who were awarded **Achievement with Excellence** commonly:

- solved problems necessitating the use of bearings and support this with clear use of geometric reasoning
- correctly used and linked both geometrical and trigonometrical reasoning to solve a problem in context
- showed confidence, knowledge and understanding when working with circle geometry
- communicated their thinking and solutions clearly and logically, using clear mathematical language
- correctly used and justified geometrical reasoning in completing geometrical proofs
- interpreted and solved problems involving three-dimensional diagrams.

Standard specific comments

Very few students could attempt proof questions without incorporating an assumption upon which they based the remainder of the proof.

Students who are able to use algebraic skills are advantaged in some questions.

Candidates need to be aware that it is permissible to draw extra lines onto the diagrams, which may help them solve the problem.

91037: Demonstrate understanding of chance and data

Candidates who were awarded **Achievement** commonly:

- calculated a probability from a table
- found the median from a scatter diagram
- interpreted a pie graph
- provided one reason / justification / feature from a scatter graph, a time series graph, a bar graph, and a box and whisker graph.

Candidates whose work was assessed as **Not Achieved** commonly:

- were unable to solve a probability problem when the information was provided in a table of results
- could not make valid statistical statements
- did not refer back to the graph when answering the questions
- did not justify their conclusions with appropriate numbers from the data and graphs
- were confused between the various features of different types of statistical graphs.

Candidates who were awarded **Achievement with Merit** commonly:

- provided reasons / justifications / features from a scatter graph, a time series graph, a bar graph, and a box and whisker graph
- supported their claims with appropriate statistical reasoning and relating these to the data provided in the question
- understood the differences, validity and appropriateness of the different types of statistical graphs and were able to make subsequent appropriate statements
- were able to display some understanding of the context used in the question.

Candidates who were awarded **Achievement with Excellence** commonly:

- provided three distinct, valid statistical reasons / justifications with reference to the data and by referring the appropriate graph
- demonstrated statistical understanding and insight
- interpreted confidently the context used in the question
- communicated their thinking, ideas, interpretations and statistical knowledge clearly and succinctly.

Standard specific comments

Most candidates were familiar with the concepts incorporated within this Achievement Standard and used the opportunities available to demonstrate their understanding.

Candidates need to ensure that their comments are statistically based and make reference to the graphs provided and data contained within them.

By necessity, the statistical information referred to in the problems needs to be a real-world context. However, this continues to be a stumbling block for some candidates.

[Mathematics and Statistics subject page](#)

Previous years' reports

[2017 \(PDF, 48KB\)](#)

[2016 \(PDF, 244KB\)](#)