

Assessment Report

Level 1 Mathematics and Statistics 2017

Standards [91028](#) [91031](#) [91037](#)

Part A: Commentary

It is important that teachers and students are fully aware of the content of the examination specifications e.g. the expectation that they will know the formula for the area of basic geometric shapes which was required for the triangle in Achievement Standard 91028.

Students without a graphics calculator were disadvantaged, especially in Achievement Standard 91028

Part B: Report on standards

91028: Investigate relationships between tables, equations and graphs

Candidates who were awarded **Achievement** commonly:

- performed simple calculations from values that had been read off a graph
- understood and could find the features of graphs such as intercepts, gradients, rate of change and vertex
- used information given:
 - - in the context of the question
 - - on tables/ graphs to find solutions and interpreted these points
- found the equation of a given graph
- investigated the relationship between the side length of a triangle and area of a triangle
- understood and correctly interpreted problems given in context
- substituted into an equation
- could draw a graph by plotting points
- recognised and explained basic features of a graph.

Candidates who were assessed as **Not Achieved** commonly:

- did not attempt sufficient questions
- could not interpret the question
- did not have the confidence to choose whether to begin with a graph, table or equation in order to start the question
- could not relate features of graphs to the given equation

- could not generate aspects of a linear equation from a given contextual (graph) model
- could not calculate the area of a triangle
- did not know how to conduct an investigation, via a table of results
- could not correctly or consistently substitute into an exponential equation
- could not perform basic algebra
- made calculation errors when substituting into equations
- could not plot points accurately
- could not set up appropriate axes and draw basic graphs.

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

- formed equations
- sketched graphs
- transformed graphs and gave the resulting equation
- compared models.

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

- reflected and translated graphs including reflecting in the y-axis
- gave the equation of a transformed graph
- used inequality statements
- applied a range of algebra and graphical skills to the context
- linked tables and graphs to their equations to solve problems
- found equations in the investigations by using a table and/or graph
- accurately and clearly explained their mathematical thinking
- gave the equation for a parabola when the equation required the use of negative, non-integer coefficients
- had rigorous algebraic understanding.

Standard specific comments

Q2(iv) there were at least three Level 1 ways to solve the swing question modelled by a parabola - substitution, create a table and improve results, graphics calculator in equations mode or graphical intersections mode, transformational operations tended to miss these when the candidates had some knowledge of the Level 2 Quadratic Formula.

Candidates should use a ruler for the drawing of axes and straight-line graphs.

Axes and points must be clearly labelled.

Key points on the graph should be clearly marked and labelled.

91031: Apply geometric reasoning in solving problems

Candidates who were awarded **Achievement** commonly:

- attempted most parts of all three questions
- annotated the diagrams – this often helped clarify the intention behind their response written in the answer space provided
- correctly solved at least two two-step angle problems, often supporting their steps with at least one appropriately stated geometric reason in each case OR correctly used trigonometry to solve at least two problems, attempting to show their step(s) in each case

- found angles and lengths associated with right-angled triangles, parallel lines, simple polygons, and simple circle geometry situations.

Candidates who were assessed as **Not Achieved** commonly:

- did not use a calculator in trigonometry and Pythagoras questions
- had little, if any, knowledge of relevant geometric reasons and how to communicate them
- were unable to use trigonometry and Pythagoras methods appropriately.
- made little progress with the any questions that involved variables.

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

- attempted all parts of all three questions
- correctly solved at least two 2-step angle problems, supporting their steps with at least one appropriately stated geometric reason in each case AND correctly used trigonometry to solve at least two problems, showing their step(s) appropriately in each case
- made significant progress with the questions that involved variables
- frequently provided a chain of geometric reasoning, often with sufficient evidence for “t” (excellence) in at least one part of one question.

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

- attempted all parts of all three questions
- correctly solved multi-step angle problems, supporting almost all their steps with appropriately stated geometric reasons
- correctly used trigonometry to solve problems, showing their step(s) appropriately often with extra comments about the processes being used
- solved problems that involved variables
- showed confidence and understanding when working with circle geometry.

Standard specific comments

Most successful candidates, increasingly so the higher the level of achievement, stated their geometric reason/justification AT THE SAME TIME as they presented a mathematical statement (equation).

Some candidates stated the words: “Alternate Segment Theorem” as a proof. They did not show or explain any geometric steps in their proof of the problem. They bypassed the opportunity to show evidence for abstract thinking for excellence (a “logical chain of reasoning”). Such responses only gained “u” (achieved). Some candidates had clearly been exposed to this theorem, even though it (and the rote learning and quoting of any such theorem) has not been a part of the NZ Curriculum for a great many years.

To provide evidence of a proof sufficient a candidate was required to demonstrate a sequence of steps with justification.

The use of variables was signalled in Level 1 Specifications and was well-handled by most candidates. Some candidates substituted a value for the variable in order to proceed with a problem – they still achieved, but at a lower level than those who could operate “in general” – an important component at excellence.

91037: Demonstrate understanding of chance and data

Candidates who were awarded **Achievement** commonly:

- were able to read a graph and answer a straightforward question.
- understood features of a graph

- calculated simple probabilities.

Candidates who were assessed as **Not Achieved** commonly:

- were unable to read graphs correctly
- struggled with the context of the question and misinterpreted it
- did not understand simple probability
- gave non-statistical answers but in a real-world situation were relevant. Eg. “Better to buy a more expensive car because it will be a better car”. “Males are more reckless drivers than females”, “The vehicle with zero carbon dioxide emissions must have been electric”.

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

- answered questions in context
- justified their answers numerically
- compared graphs
- understood the concept of a question.

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

- made precise statements with justification.
- were able to explain more than one feature of a graph
- showed insight into the real-life contexts and were able to bring understanding to their answers.

Standard specific comments

Unfamiliar real-world contexts proved challenging for some students at all levels of achievement.

Many candidates were able to make quite insightful answers about the context but were unable to make valid statistical statements.

Mathematics and Statistics subject page

Previous years' reports

[2016 \(PDF, 0KB\)](#)