

National Certificate of Educational Achievement

2014 Assessment Report

Mathematics and Statistics Level 1

- 91028** Investigate relationships between tables, equations and graphs
- 91031** Apply geometric reasoning in solving problems
- 91037** Demonstrate understanding of chance and data

STANDARD REPORTS

91028 Investigate relationships between tables, equations and graphs

ACHIEVEMENT

Candidates who were awarded Achievement for this standard demonstrated the required skills and knowledge. They commonly:

- could write an equation representing a word problem
- could distinguish between a linear and quadratic graph.

NOT ACHIEVED

Candidates who were awarded Not Achieved for this standard lacked some or all of the skills and knowledge required for the award of Achievement. They commonly:

- did not understand a quadratic relationship
- did not understand the context of a question.

ACHIEVEMENT WITH MERIT

In addition to the skills and knowledge required for the award of Achievement, candidates who were awarded Achievement with Merit commonly:

- understood the relationship between graphs and equations of a parabola
- had some understanding of the context of a question
- understood the difference between discrete and continuous data.

ACHIEVEMENT WITH EXCELLENCE

In addition to the skills and knowledge required for the award of Achievement with Merit, candidates who were awarded Achievement with Excellence commonly:

- were able to clearly describe how the context of a question dictated how a graph was drawn (i.e. whether it was continuous or discrete and whether particular values were relevant in a particular context)
- understood transformations of graphs
- were able to accurately describe graphs and the difference between graphs using appropriate mathematical language.

OTHER COMMENTS

Candidates struggled with an exponential graph with two transformations.

91031 Apply geometric reasoning in solving problems

ACHIEVEMENT

Candidates who were awarded Achievement for this standard demonstrated the required skills and knowledge. They commonly:

- selected an appropriate procedure – trigonometrical ratios or Pythagoras' theorem
- demonstrated knowledge of geometrical terms and concepts and used them correctly
- selected and used appropriate rules and properties for circle geometry, polygons and parallel lines
- knew what a protractor was and how to read it.

NOT ACHIEVED

Candidates who were awarded Not Achieved for this standard lacked some or all of the skills and knowledge required for the award of Achievement. They commonly:

- misused trigonometric ratios and Pythagoras' Theorem
- lacked understanding of the given context
- mixed up letters on the diagrams in their solutions
- were not clear in reasoning and used rules that did not apply to the problem
- were unclear in describing rules and geometric concepts.

ACHIEVEMENT WITH MERIT

In addition to the skills and knowledge required for the award of Achievement, candidates who were awarded Achievement with Merit commonly:

- used the properties of triangles, circles, polygons and parallel lines
- developed a chain of reasoning in finding the size of angles in a variety of contexts- circles, triangles, parallel lines and polygons
- communicated and related geometric rules
- understood and clearly communicated the requirements for a shape to tessellate relating to angles at a point
- recognised when a negative exterior angle will eventuate
- used generally accepted language to describe geometric terms and rules
- communicated effectively the link between co-interior angles and the need for the lines to be parallel for this to occur.

ACHIEVEMENT WITH EXCELLENCE

In addition to the skills and knowledge required for the award of Achievement with Merit, candidates who were awarded Achievement with Excellence commonly:

- developed a clear chain of reasoning to prove relationships using properties of circles and triangles
- understood properties of similar triangles
- developed a generalisation around tessellating shapes
- related properties of polygons, angles and parallel lines to the given information to develop a proof
- understood and explained properties of geometric concepts and were able to communicate the final conclusion in a logical argument.

OTHER COMMENTS

Candidates would not always notice important information or follow instructions.

91037 Demonstrate understanding of chance and data

ACHIEVEMENT

Candidates who were awarded Achievement for this standard demonstrated the required skills and knowledge. They commonly:

- related basic probability knowledge and concepts to the real life situation comparisons
- were able to relate aspects of experimental and theoretical probability
- made statistical interpretations from graphs and data
- made appropriate deductions from using data
- were able to transfer probability concepts into forecasting real-life hypothetical situations.

NOT ACHIEVED

Candidates who were awarded Not Achieved for this standard lacked some or all of the skills and knowledge required for the award of Achievement. They commonly:

- omitted stating the variable(s) involved when making comparisons using statistical graphs
- did not refer to the context of the question
- mis-read information from the text of questions and statistical graphs
- were unable to do numerical calculations correctly when required: e.g. find a percentage; a subtraction of two decimal numbers; the simple additions, multiplications and subtractions of whole numbers
- were not able to calculate basic deductions using probability
- could not make statistical interpretations from data

- were not able to interpret the requirements and instructions contained within questions
- could not use statistical graphs and data to make basic interpretations
- had basic misunderstandings of probability theory of equally likely events and of comparing data sets with different sample sizes.

ACHIEVEMENT WITH MERIT

In addition to the skills and knowledge required for the award of Achievement, candidates who were awarded Achievement with Merit commonly:

- were able to provide more than one viewpoint whilst making correct interpretations of statistics and data
- had a greater depth of understanding of probability concepts and theories
- could correctly interpret statistical graphs, showing the knowledge and understanding to justify statements and findings
- were able to display a thorough understanding of statistical visual displays
- had a good understanding of how graphs can be used to compare appropriately between two variables
- were able to apply probability knowledge into a problem solving situation
- made reference to a wide range of features of the data sets (e.g. range, variability, consistency, shape and pattern) when making comparisons, not just specific, individual points of similarity and/or difference
- gave more in-depth answers at every opportunity e.g. their responses included several different points of comparison.

ACHIEVEMENT WITH EXCELLENCE

In addition to the skills and knowledge required for the award of Achievement with Merit, candidates who were awarded Achievement with Excellence commonly:

- expressed their ideas in their own words and did not rely on learned responses
- gave concise, clear and non-repetitive responses
- were able to support their conclusions with a variety of differing justifying statements, applied in context
- integrated their statistical and contextual information and knowledge to illustrate their deeper understanding
- were able to relate and inter-connect information provided in various graphs and formats, forming clearly explained and justified conclusions
- had knowledge of the most accurate and effective ways of comparing sets of data
- were able to transfer information provided in a problem situation so that an appropriate deduction could be made, showing statistical insight.

OTHER COMMENTS

Candidates thought that outcomes were always equally likely.

There was widespread misunderstanding of the concept of experimental probability.

Very few candidates could discuss the significance of the similar mean and median values of a distribution.

A common misconception was that data sets could not be compared when different sample sizes were involved.

In-context interpretation of statistical and probability ideas was a feature of many responses.

Candidates need to know that responses to questions need to be produced from a variety of different viewpoints, often a one aspect solution will not be sufficient to target the higher levels of achievement. A candidate needs to seek ways in which their intuitive thought, in relation to the problem being investigated, can be stretched. Often the questions themselves contain relevant information that needs to be interpreted fully so that the candidate is confident about discussing both sides of a situation before making a conclusion.

Successful candidates are those who can connect a graph and the problem situation before then making several, in-depth, detailed conclusions.

For candidates to interpret fully the contextual situation many statistical and probability theories, graphs, data formats and concepts need to be thoroughly understood and blended together.

Some candidates had basic misconceptions about probabilities or comparing data sets effectively that disadvantaged them in this assessment.

Candidates need to recognise that all decisions and conclusions are expected to be justified, usually in several ways, although the question might not explicitly say so.

Candidates need to remember that speculation is something not rewarded. Many of the questions were clearly stipulating “use statistical or probability ideas” in which case extra knowledge about the context is not usually appropriate and relevant.

Candidates should be aware that they are able to transfer knowledge from internal AS 1.10, AS 1.11, AS 1.13 into their responses in this Achievement Standard.