

National Certificate of Educational Achievement

2011 Assessment Report

Mathematics and Statistics Level 1

- 91027 Apply algebraic procedures in solving problems**
- 91028 Investigate relationships between tables, equations and graphs**
- 91031 Apply geometric reasoning in solving problems**
- 91037 Demonstrate understanding of chance and data**

COMMENTARY

Most candidates were well prepared for this exam. Candidates gaining Achievement with Merit demonstrated relational thinking showing understanding of concepts and linked different concepts and representations.

Candidates gaining Achievement with Excellence developed a chain of logical reasoning using correct mathematical statements and relating answers in context.

91027 Apply algebraic procedures in solving problems (MCAT)

THE ASSESSMENT TASK

Candidates were most successful with questions involving

- achieving Merit in the indices question
- solving linear equations
- expanding a quadratic
- solving simultaneous equations.

Candidates had most difficulty with questions involving

- finding square roots
- collecting like terms
- solving inequations
- solving questions involving more reading
- answering questions in context
- factorising quadratics and where there is a common factor
- simplifying algebraic fractions
- demonstrating an understanding of a quadratic equation.

VERIFICATION

Most common errors in the teacher's application of the schedule

- identifying answers that are consistent following an error in working
- identifying where evidence for Achievement or Merit thinking is shown in a candidate's answer
- not recognizing appropriate sufficiency
- allocating more than one grade within a question
- giving credit for a correct answer when no supporting algebraic working was shown
- not recognizing when there was only one term out of place in the changing the subject
- not marking all answers
- recording the grade for each answer in the booklet.

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:

- started all three questions
- attempted almost all parts of each question.

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:

- attempted too few parts of questions.

ACHIEVEMENT WITH MERIT

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

- found equations for models for given situations i.e. wrote complete equations for relationships (i.e. included $y = \dots$ in the response)
- used the graphics calculator for equations and graph sketches
- used piecewise graphs in context.

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:

- supported their equations and graph sketches for models with algebraic working, even where a graphics calculator had clearly been used
- expressed word answers clearly and concisely
- showed they understood piecewise graphs in context, and often, the discontinuities as well
- showed understanding of quadratic modelling situations.

91031 Apply geometric reasoning in solving problems

ACHIEVEMENT

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

- found required angles and lengths.

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:

- interpreted a diagram correctly
- incorrectly applied geometric properties.

ACHIEVEMENT WITH MERIT

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

- connected different concepts and representations
- followed a logical sequence of steps
- showed understanding of geometric properties
- used two-step processes to solve problems.

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 chain of logical reasoning
- explained answers in context
- interpreted diagrams
- recognised whether the answer made sense
- used correct mathematical statements and notation
- gave full and adequate explanations and reasons
- demonstrated good understanding of angle properties and linked these properties.

91037 Demonstrate understanding of chance and data

COMMENTARY

Candidates need familiarity with a range of graphs and statistics and need to be able to relate them to the context in hand. Candidates who achieved well in this standard showed familiarity with the statistical enquiry cycle and critically evaluated the experimental contexts presented.

Most candidates who achieved the standard showed an ability to read graphs and answered questions about graphs across a range of contexts.

Many candidates who did not achieve did not answer questions in enough detail or with enough care to demonstrate their understanding. A candidate's answer to a question may be used to award any grade, but this depends on the quality (not quantity!) of their answer.

ACHIEVEMENT

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

- answered questions about graphs and statistics across a range of contexts
- identified trends, probabilities, unusual features, and variation in data
- used appropriate statistical language
- showed understanding of the process of statistical investigation so that they could follow the context described.

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:

- showed evidence of having misread points on graphs when they were not on the grid lines
- did not answer in sufficient detail as demanded by the question
- made careless errors in counting or in calculation
- did not communicate the concepts of average or probability
- did not read questions carefully or accurately.

ACHIEVEMENT WITH MERIT

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

- clearly stated valid statistical reasons for coming to a conclusion
- connected their reasoning with, and showed clear understanding of, the context given
- answered the questions according to the instructions, giving requested detail, reasons or answers
- showed understanding of the process of statistical investigation.

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:

- reflected on the validity of a statistical process
- critically evaluated processes in a clear and concise manner
- determined the limitations and weaknesses of an experiment or set of data
- showed understanding of the effect of the sample's size or composition on the validity of any conclusions that might be drawn
- showed understanding of the process of statistical investigation.

OTHER COMMENTS

Question Three candidates did not show understanding of the instructions the way they might have been expected to.

In Question Three (f), where they had a more free-flow response, many did not respond to the second part on limitations.

The questions enabled candidates to access most parts, allowing markers to determine enough evidence to award Achievement.