Assessment Specifications

General information

Subject	Mathematics and Statistics (Mathematics)
	[Mathematics and Statistics (Statistics)](#)
Level	3
Mode of Assessment	Written Examination
For Year	2015 (Updated March 2015)
Standards	91577, 91578, 91579

Format for the assessment

All questions will provide opportunity for candidates to demonstrate all levels of performance: Achievement, Achievement with Merit, and Achievement with Excellence.

This can be achieved in a variety of ways:

- The questions may have multiple parts.
- The parts of a question may be linked.
- There may be scaffolding within the question.

Opportunities for Merit and Excellence will be spread through the paper.

Question parts may not be arranged in order of increasing difficulty.

Correct answers only may not be sufficient for showing evidence of the level of thinking required by the standard.

Unless a method is specified within a question, candidates may choose their method when solving a problem, although the grade awarded may be affected by the level of thinking applied in solving the problem. Guess-and-check methods are unlikely to show the required thinking.

Candidates must show any working that is asked for in the assessment, eg derivatives, anti-derivatives, and equations.

Equipment to bring

Candidates must bring an approved calculator (preferably a graphing calculator).
Candidates who do not have access to graphing calculators will be disadvantaged.

Resources or information provided

A Formulae and Tables Booklet will be provided.

Special notes

Candidates will be required to answer questions that demonstrate an understanding of the mathematical concepts rather than directly transferring results from their graphing calculator. This may involve use of unknown constants.

As good mathematical practice, candidates should be encouraged to show intermediate steps clearly and logically, communicating what is being calculated. Candidates who give the correct response only may lose the opportunity to provide evidence for other grades or to have minor errors ignored.

Unless otherwise stated, rounding of any numerical answers to three significant figures will be of sufficient accuracy. Minor errors caused by rounding will not be penalised. Inappropriate use of units may count as a minor error and may not be penalised. It is expected that relevant working will be shown.

When graphing calculators are used to solve a problem, candidates must provide evidence of their differentiation and integration skills.

Content/context details

Problems will be set in real life or in mathematical contexts.

Solutions for problems providing opportunities for Achievement with Merit and Achievement with Excellence may incorporate content knowledge from other level 3 Calculus achievement standards.

Problems that allow candidates to provide evidence for Achievement with Excellence may require candidates to devise their own model.

Specific information for individual external achievement standards

Standard	91577
Title	Apply the algebra of complex numbers in solving problems
Domain	Algebra
Version	1
Number of Credits	5

Further clarification of the achievement standard

Candidates will be required to demonstrate high-level algebra skills in a logical manner, including the manipulation of constants, eg solving an equation to find an expression for x in terms of k.

Note that complex numbers include real numbers.

Standard 91578

Title Apply differentiation methods in solving problems

Domain Calculus

Version 1

Number of Credits 6

Further clarification of the achievement standard

Candidates using graphing calculators will not receive credit for correct solutions to problems assessed against this standard where they have not provided the correct derived function.

Problems assessing optimisation at Achievement and Achievement with Merit level will not require candidates to prove that a solution is a maximum or a minimum. This will be given by a statement such as:

"You may assume that $\dfrac{d^2P}{dx^2} > 0$" OR "You may assume that your solution is a minimum".

Problems will assess understanding of concepts of differentiation.

Candidates must show any derivatives that are needed to solve the problems.

Candidates may be required to form their own equations for problems that provide evidence for Achievement with Merit and Achievement with Excellence.

Equations of tangents may be included.

Standard 91579

Title Apply integration methods in solving problems

Domain Calculus

Version 1

Number of Credits 6

Further clarification of the achievement standard

Candidates using graphing calculators will not receive credit for correct solutions to problems assessed against this standard where they have not provided the correct integrated function. That is, candidates must show the results of any integration needed to solve a problem.

Candidates may be required to form their own equations for problems providing evidence for Achievement with Merit and Achievement with Excellence.

Solving differential equations may require manipulation of exponents and logarithms.

Subject   Mathematics and Statistics (Statistics)

Level   3

Mode of Assessment   Written Examination

For Year   2015 (Updated March 2015)

Standards   91584, 91585, 91586

Format for the assessment

All questions will provide opportunity for candidates to demonstrate all levels of performance:

Achievement, Achievement with Merit, and Achievement with Excellence.

This can be achieved in a variety of ways:

- The questions may have multiple parts.
- The parts of a question may be linked.
- There may be scaffolding within the question.

Opportunities for Merit and Excellence will be spread through the paper.

Question parts may not be arranged in order of increasing difficulty.

Correct answers only may not be sufficient for showing evidence of the level of thinking required by the standard.

Unless a method is specified within a question, candidates may choose their method when solving a problem although the grade awarded may be affected by the level of thinking applied in solving the problem. Guess-and-check methods are unlikely to show the required thinking.

Candidates must show any working that is asked for in the assessment.

Equipment to bring

Candidates must bring an approved calculator (preferably a graphing calculator).
Candidates who do not have access to graphing calculators will be disadvantaged.

Resources or information provided

A Formulae and Tables Booklet will be provided.

Content / context details

Solutions for problems may also require knowledge up to and including Statistics Curriculum Level 7.

Questions may be set in a statistical context.

Questions may require candidates to interpret their solutions in context.

Special notes

Candidates will be required to demonstrate an understanding of the statistical concepts.

Minor errors will not be penalised. Rounding in context may be required.

The answer from one question part may be required in answering subsequent parts. In this case, consistency of response will be assessed as being correct, provided the solution is not an essential component of the standard and providing the incorrect solution does not result in an easier problem to be solved.

Specific information for individual external achievement standards

Standard	91584
Title	Evaluate statistically based reports
Domain	Statistics
Version	1
Number of Credits	4

Further clarification of the achievement standard

Candidates will need to answer questions about statistically based reports. The questions will require candidates to evaluate claims or conclusions made in the report. For example, this could involve:

- identifying and discussing potential sources of error associated with surveys
- calculating and interpreting margins of error
- identifying and assessing causal-relationship inferences.

Candidates will not be provided with formulae for margin of error. Candidates should recall and use the "rules of thumb" based on $1/\sqrt{n}$, but will not be penalised for using norm-based formulae appropriately.

Resources or information provided

Candidates will be provided with a Resource Booklet and a Question and Answer booklet.

Content/context details

Reports will be set in real-life contexts.

| **Standard** | 91585 |

| **Title** | Apply probability concepts in solving problems |

| **Domain** | Statistics |

| **Version** | 1 |

| **Number of Credits** | 4 |

Further clarification of the achievement standard

Probabilities may be expected to be calculated from formulae, a probability distribution table or graph, tables of counts or proportions, simulation results, or from written information. Candidates should clearly show the method they have used to calculate probabilities and state assumptions made.

Content / context details

Questions will be set in real-life or statistical contexts.

Candidates may be required to interpret solutions in context.

Sensible rounding is expected. Early rounding may be penalised.

| **Standard** | 91586 |

| **Title** | Apply probability distributions in solving problems |

| **Domain** | Statistics |

| **Version** | 1 |

| **Number of Credits** | 4 |

Further clarification of the achievement standard

Probabilities may be expected to be calculated from distributions presented as formulae, tables or graphs of data, simulation results, or from written information. Candidates should clearly identify the distribution applied in solving the problem and state assumptions made.

Candidates will need to be familiar with the Normal, Poisson, binomial, uniform, and triangular distributions.

Candidates may be expected to calculate or estimate the mean and standard deviation of a random variable.

Content / context details

Questions will be set in real-life or statistical contexts.

Candidates may be required to interpret solutions in context.

Sensible rounding is expected. Early rounding may be penalised.