

## GUIDANCE ON THE EVIDENCE REQUIRED IN EXTERNAL ASSESSMENTS FOR NCEA LEVELS 1-3 MATHEMATICS

- In mathematics assessment the minimum acceptable evidence that a candidate must supply is the correct response only (CRO). Working will not be assessed except where more evidence is required by the standard e.g.
  - evidence of the method used in solving trig ratio and Pythagoras problems AS90152
  - derivatives and integrals of functions as stated in achievement standards AS90286, AS90635, AS90636
  - the equation where these need to be formed in AS90644, AS90284, AS90147, AS90284, AS90290
  - use of iterative methods in AS90644
  - proofs or interpretations as required
- Candidates should be encouraged to show intermediate steps in their working. By just giving the CRO they may lose the opportunity
  - to have “minor errors ignored”
  - to provide further evidence for the lower grades of achievement.
- Because of the wide spread use of graphics calculators and the subsequent risk of trivialisation, questions may have an increased use of interpretation or pro-numerals (non numeric values eg solve  $(x + a)(x - b) = 0$  in AS90147 or  $z = (a + bi)(c + di)$  as stated in General Explanatory Note 3 of AS90638). This implies, especially for merit and excellence, particularly at level 2 and 3, the candidates will not be able to answer all questions by simply plugging values into the calculator.
- It is strongly advised that students have access to the use of graphics calculators in teaching, learning and assessment situations. While it was intended that students who did not use technology would not be disadvantaged this is clearly no longer the case. Candidates who do not have access to a graphics calculator in the external assessments especially at level 2 and 3 are disadvantaged both with respect to demonstrations of the skills required and the time to complete the assessment.

The Graphics calculator resources that follow give guidance as to the aspects of the Achievement Criteria for which the graphics calculator assists students. These are updates done in 2006.

## Achievement Standard Level 1

**Subject** Mathematics AS90147 Use straightforward algebraic methods and solve equations  
**Reference**

	Achievement Criteria	Explanatory Notes	GC Impact
<b>Achievement</b>	<ul style="list-style-type: none"> <li>Use straightforward algebraic methods.</li> </ul>	<ul style="list-style-type: none"> <li>Assessment will be based on a selection from:               <ul style="list-style-type: none"> <li>factorising and expanding</li> <li>simplifying algebraic expressions involving exponents, such as <math>(2x)^3</math> and <math>\frac{12a^5}{8a^2}</math></li> <li>substituting values into formulae</li> <li>describing linear patterns based on diagrams or tables.</li> </ul> </li> </ul>	NA
	<ul style="list-style-type: none"> <li>Solve equations.</li> </ul>	<ul style="list-style-type: none"> <li>Assessment will be based on a selection from:               <ul style="list-style-type: none"> <li>solving linear equations such as <math>5x + 12 = 3 + 2x</math> or <math>3(x + 2) = 7</math></li> <li>solving factorised equations such as <math>(x-1)(2x+3) = 0</math>.</li> </ul> </li> </ul>	All GC
<b>Achievement with Merit</b>	<ul style="list-style-type: none"> <li>Use algebraic methods and solve equations in context.</li> </ul>	<ul style="list-style-type: none"> <li>Assessment will be based on a selection from:               <ul style="list-style-type: none"> <li>manipulating and simplifying expressions in advance of Achievement level, such as <math>\frac{x}{4} + \frac{x}{3}</math> and <math>\frac{x^2 - 4}{x - 2}</math></li> <li>describing quadratic patterns</li> <li>rearranging formulae</li> <li>forming and solving linear equations or inequations</li> <li>solving simple quadratic equations such as <math>x^2 + 30x = 400</math> and interpreting the results (completing the square and the quadratic formula are not required)</li> <li>solving pairs of simultaneous linear equations.</li> </ul> </li> </ul>	NA  NA NA GC GC  GC
<b>Achievement with Excellence</b>	<ul style="list-style-type: none"> <li>Use algebraic strategies to investigate and solve problems.</li> </ul>	<ul style="list-style-type: none"> <li>Problems will involve:               <ul style="list-style-type: none"> <li>modelling by forming and solving appropriate equations</li> <li>interpretation in context.</li> </ul> </li> </ul>	GC to solve equation