

## Briefing Note: NCEA Level 2 Mathematics and Statistics Examination Review Findings and Next Steps

Date:	19 February 2020	Priority:	Medium
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### Purpose

1. This briefing provides you with the Review Panel's findings relating to the error in the NCEA Level 2 examination for Mathematics and Statistics – Achievement Standard 91261 *Apply algebraic methods in solving problems*<sup>1</sup>, and NZQA's next steps.
2. NZQA proposes to proactively release this briefing as part of the next publication of documents.

### Background

3. The NCEA Level 2 Mathematics and Statistics examination was held on 21 November 2019.
4. There was an error in a diagram in Question 2(d), designed to assess Excellence in the Algebra paper [91261 *Apply algebraic methods in solving problems*].
5. NZQA established a review panel<sup>2</sup> to investigate why the error in the paper was not identified during the multiple checks and controls that are applied to examination papers, and whether changes are necessary to assurance procedures and methods for these types of questions.
6. The Review Panel was also asked to review the quality assurance methods and procedures for mathematics papers and the end-to-end examination paper development

<sup>1</sup> CR19907, Briefing Note: Level 2 Mathematics and Statistics Examination, 25 November 2019, CR19938, Briefing Note: Level 2 Mathematics and Statistics Examination Review, 25 November 2019, CR20015, Briefing Note: Level 2 Mathematics and Statistics Examination Review update, 12 December 2019 and CR20090, Aide-Memoire: NCEA Results Release, 9 January 2020.

<sup>2</sup> The Review Panel comprised of Adjunct Professor Sharleen Forbes (chair), Mathematics and Statistics expert from the Technical Overview Group Assessment; Rhona Lever, former Head of Mathematics, Rangī Ruru Girls' School; a senior specialist from NZQA's Quality Assurance Division, and a senior NZQA Business Operations Manager (not involved with the examinations development process).

process in order to make recommendations on how the system can be further strengthened to prevent such an error occurring again.

7. Following an initial meeting on 3 December 2019, the Review Panel reconvened on 28 and 29 January 2020 to complete its review.
8. NZQA has received the finalised report *Review of the causes of the error in the 2019 NCEA Level 2 Mathematics and Statistics examination (Standard 91261)* (attached as an Appendix).

## Discussion

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### *Review panel findings*

9. The Review Panel was of the view that the current examination development process has an adequate number of quality assurance checks, and that the process was followed with this paper, but there are a number of improvements that could be made to prevent this type of error occurring.
10. The Review Panel noted that the error in the diagram was created at the very first iteration of the paper's development, and was not detected through any subsequent stages of the checking for the paper by the Examiner and other members of the examination development team for this standard. However, the Review Panel noted that the appropriate practice would have been for the checks to have included rechecking of the calculations by substituting the values back into the original diagram. The Review Panel's recommendations include changes to ensure that this is clarified in the instructions and checklists for examination development.
11. The Review Panel found nothing in the statistical data to suggest that the error had a negative impact on the overall performance of the student cohort. The panel noted that Question 2(d) was a straightforward quadratic equation problem which could be solved in several ways. Not all of the methods would have caused candidates to refer back to the diagram. The error could only have been detected if a candidate re-checked their calculations by substituting values back into the diagram. The Review Panel also noted that evidence from the marking indicated that most candidates had successfully answered the question and did not check their answer against the diagram.
12. The Review Panel was also assured and noted that any concerns relating to the error were addressed in the marking process; those candidates who completed the task and crossed it out were not penalised, as the crossed-out work was considered for assessment. Candidates were still able to demonstrate their mathematical competencies to a sufficient level for the marker to recognise they were able to meet the requirements for Excellence.

### *Review Panel recommendations for strengthening NZQA's systems and approach*

13. The Review Panel made a number of specific recommendations to further improve the links across quality assurance instructions for examination development personnel. In addition, the panel recommended some changes to improve clarity in distinct roles across the examination development team.
14. The Review Panel recommended that NZQA:
  - i. Review and amend the Process Flow Chart and Examination Development Guide Notes and Instructions to include links between the NZQA NAF and examination development personnel; and ensure its consistency with the *Examination Development Guide Notes and Instructions*.

- ii. Review the checklist templates to ensure that they are consistent and up to date;
- iii. Ensure all [externally contracted specialist workforce] personnel have contracts that are regularly updated; and that they are using the current form of documents and checklists.
- iv. Amend Appendix D in the *2019 Examination Development Guide Notes and Instructions* to ensure that there is specific reference to diagrams.
- v. Review the position descriptions of all the roles (internal and external) in the examination development process to ensure that they are clear about their distinct roles in the quality assurance process.
- vi. Consider ways in which informal contacts, messages, discussions, etc. between examination personnel can be recorded for audit purposes, particularly as they relate to key decision points in the examination development process.

## Next steps

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- 15. NZQA accepts the Review Panel's recommendations and planning is underway to implement each of the recommendations.
- 16. An action plan, which will be developed by the end of February, will ensure position descriptions, specialist workforce contracts, quality assurance processes and procedures, and training are all amended in light of the recommendations.
- 17. The revised ways of working will be reinforced through our training of examination development contractors and NZQA's National Assessment Facilitators for the 2020 Examination Cycle; through oversight of our quality assurance processes; and through continuous improvement reviews at the end of each examination cycle.
- 18. NZQA's Strategic Management Team will monitor the implementation of this action plan.
- 19. The final Report of the Review Panel will be published on NZQA's website in due course.



Karen Poutasi (Dr)  
Chief Executive, NZQA

19 February 2020

Agreed/Noted

**Hon Chris Hipkins**  
Minister of Education

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