

Fields Māori and Sciences**Revision to add an interpretation in Māori to *Mathematics and Statistics Level 2* achievement standards and development of new *Pāngarau* achievement standards**

Change report republished in June 2016 to correct error in Appendix

Revised achievement standards (interpretations)

| Domain | ID | Subject reference |
|--------------|----------------------------|--|
| Algebra | 91257, 91258, 91261, 91269 | Mathematics and Statistics 2.2, 2.3, 2.6, 2.14 |
| Calculus | 91262 | Mathematics and Statistics 2.7 |
| Geometry | 91256, 91260 | Mathematics and Statistics 2.1, 2.5 |
| Trigonometry | 91259 | Mathematics and Statistics 2.4 |
| Probability | 91267, 91268 | Mathematics and Statistics 2.12, 2.13 |
| Statistics | 91263-91266 | Mathematics and Statistics 2.8-2.11 |

New achievement standards

| Domain | ID | Subject reference |
|----------|--------------|---------------------|
| Pāngarau | 91764, 91765 | Pāngarau 2.15, 2.16 |

The Ministry of Education has completed revision and development of the achievement standards listed above.

New Registration date **November 2015**

Date new versions published **December 2015**

Planned review date **December 2018**

Summary of revision, development, and consultation process

In 2010 the Ministry of Education, in association with the New Zealand Qualifications Authority and subject working groups, began to develop achievement standards derived from outcomes in *Te Marautanga o Aotearoa* (TMoA). This development also addressed duplication of outcomes, credit parity, fairness, consistency and coherence. The development was guided by the direction of *Te Marautanga o Aotearoa* and the Standards Review Guidelines. A copy of TMoA is available at: <http://tmoa.tki.org.nz/Nga-Marautanga-o-Aotearoa/Te-Marautanga-o-Aotearoa>.

Draft achievement standards were developed with the involvement of teacher subject working groups. The draft standards were the focus of wide consultation, especially with kaiako (teachers) in wharekura (secondary programmes in Māori-medium schools). Resources were also developed to support the standards.

Outline of interpretation process

The interpretations were undertaken by subject and language specialists contracted by the Ministry of Education, and were quality assured by Ministry of Education staff and an externally contracted critique group comprised of language specialists. The Māori interpretations follow the English versions of the standards in the documents.

Main changes resulting from revision

- All TMoA Level 7 (NZQF Level 2) outcomes are now assessed using achievement standards (there are no longer any unit standards linked to TMoA).
- Grading criteria for achievement standards were reviewed in accordance with the Standards Review Guidelines.
- Mathematics and Statistics achievement standards aligned with outcomes from the New Zealand Curriculum (NZC), 2.1-2.14 (91256-91269), were re-interpreted in te reo Māori in line with the standard template for Māori-medium achievement standards.
- Two new, unique Pāngarau achievement standards, Pāngarau 2.15 & 2.16 (91764 & 91765), (not translated from existing standards) were developed to reflect the cross strands Te Reo Matatini o te Pāngarau (maths literacy) and Te Whakamahinga o te Pāngarau (the use of mathematics):

For a detailed description of the revision of, and the changes to, the **Mathematics and Statistics, and Pāngarau** standards see the **Appendix** at the end of this report.

Impact on existing organisations with consent to assess

None.

Impact on Consent and Moderation Requirements (CMR)

All new achievement standards have been registered on CMR 0233.

Impact on registered qualifications

None.

Impact of changes on [Exclusions List](#)

None.

Detailed list of achievement standards – classification, title, level, and credits

Interpretations

Sciences > Mathematics > Algebra

| ID | Ref | Title | Level | Credit |
|-------|--------------------------------|--|-------|--------|
| 91257 | Mathematics and Statistics 2.2 | Apply graphical methods in solving problems Te whakamahi tikanga kauwhata pānga hei whakaoti rapanga | 2 | 4 |

| ID | Ref | Title | Level | Credit |
|-------|---------------------------------|--|-------|--------|
| 91258 | Mathematics and Statistics 2.3 | Apply sequences and series in solving problems Te whakamahi tapeke raupapa hei whakaoti rapanga | 2 | 2 |
| 91261 | Mathematics and Statistics 2.6 | Apply algebraic methods in solving problems [Externally Assessed] Te whakamahi tikanga taurangi hei whakaoti rapanga [Externally Assessed] | 2 | 4 |
| 91269 | Mathematics and Statistics 2.14 | Apply systems of equations in solving problems Te whakamahi whārite tukutahi hei whakaoti rapanga | 2 | 2 |

Sciences > Mathematics > Calculus

| ID | Ref | Title | Level | Credit |
|-------|--------------------------------|--|-------|--------|
| 91262 | Mathematics and Statistics 2.7 | Apply calculus methods in solving problems [Externally Assessed] Te whakamahi tikanga tuanaki hei whakaoti rapanga [Externally Assessed] | 2 | 5 |

Sciences > Mathematics > Geometry

| ID | Ref | Title | Level | Credit |
|-------|--------------------------------|---|-------|--------|
| 91256 | Mathematics and Statistics 2.1 | Apply co-ordinate geometry methods in solving problems Te whakamahi tikanga āhuahanga taunga hei whakaoti rapanga | 2 | 2 |
| 91260 | Mathematics and Statistics 2.5 | Apply network methods in solving problems Te whakamahi tikanga rauara hei whakaoti rapanga | 2 | 2 |

Sciences > Mathematics > Trigonometry

| ID | Ref | Title | Level | Credit |
|-------|--------------------------------|--|-------|--------|
| 91259 | Mathematics and Statistics 2.4 | Apply trigonometric relationships in solving problems Te whakamahi pānga pākoki hei whakaoti rapanga | 2 | 3 |

Sciences > Statistics and Probability > Probability

| ID | Ref | Title | Level | Credit |
|-------|---------------------------------|---|-------|--------|
| 91267 | Mathematics and Statistics 2.12 | Apply probability methods in solving problems [Externally Assessed] Te whakamahi tikanga tūponotanga hei whakaoti rapanga [Externally Assessed] | 2 | 4 |
| 91268 | Mathematics and Statistics 2.13 | Investigate a situation involving elements of chance using a simulation Te tūhura pūāhua tūponotanga mā te whakatipu putanga whakamātau tūpono | 2 | 2 |

Sciences > Statistics and Probability > Statistics

| ID | Ref | Title | Level | Credit |
|-------|---------------------------------|--|-------|--------|
| 91263 | Mathematics and Statistics 2.8 | Design a questionnaire | 2 | 3 |
| | | Te waihanga i te uiui pāngarau | | |
| 91264 | Mathematics and Statistics 2.9 | Use statistical methods to make an inference Te whai i ngā tikanga o te tūhuratanga tauanga hei whakaputa hīkaro | 2 | 4 |
| 91265 | Mathematics and Statistics 2.10 | Conduct an experiment to investigate a situation using statistical methods Te whakamahi tikanga whakamātau tauanga hei tūhura i tētahi huinga raraunga | 2 | 3 |
| 91266 | Mathematics and Statistics 2.11 | Evaluate a statistically based report Te arotake i te pūrongo tauanga hei tautohu i te whaihua o ngā whakapae | 2 | 2 |

New achievement standards

Māori > Te Marautanga o Aotearoa > Pāngarau

| ID | Ref | Title | Level | Credit |
|-------|----------------------|---|-------|--------|
| 91764 | Pāngarau 2.15 | Te whakahaere rangahau pāngarau | 2 | 3 |
| 91765 | Pāngarau 2.16 | Te tātari i te reo motuhake o tētahi kōrero pāngarau | 2 | 3 |

Development of *Pāngarau* Level 2 Achievement Standards

Process of aligning standards with Te Marautanga o Aotearoa

The process of aligning achievement standards with Te Marautanga o Aotearoa (TMoA) was informed by a series of audits across all learning areas conducted by Māori-medium subject specialists.

A panel of *Pāngarau* specialists working in *wharekura* was convened by the Ministry of Education to determine the extent to which the existing achievement standards met the *whāinga paetae* (achievement objectives) within the *Pāngarau* learning area of TMoA. Following this exercise, the panel noted the following:

- Levels 6, 7 and 8 of the *Pāngarau* learning area of TMoA align very closely with Mathematics and Statistics in the New Zealand Curriculum (NZC).
- The one significant point of difference between *Pāngarau* in TMoA and Mathematics and Statistics in the NZC are the *whāinga paetae* relating to the two cross strands 'Te Reo Matatini o te *Pāngarau*', which focuses on literacy in *Pāngarau* and 'Te Whakamahinga o te *Pāngarau*', which focuses on the use of *Pāngarau*.
- It is in the best interests of students in Māori-medium schooling studying *Pāngarau* at this level to have access to the full range of achievement standards offered in Mathematics and Statistics. This will ensure that senior students from *wharekura* are not disadvantaged if they wish to study Mathematics and Statistics at university level, or take courses which require a grounding in Mathematics and Statistics.

Accordingly, at Level 2, Mathematics and Statistics achievement standards 2.1–2.14 (91256–91269) were interpreted into te reo Māori, in line with the standard template for Māori-medium achievement standards. Two new, unique *Pāngarau* achievement standards 2.15 (91764) and 2.16 (91765) were developed to reflect the cross strands Te Reo Matatini o te *Pāngarau* and Te Whakamahinga o te *Pāngarau*.

Supporting documents were developed to assist in the interpretation of achievement standards and the development of teaching and learning programmes.

Addressing duplication

Issues of duplication for the *Pāngarau* standards 2.1–2.14 (91256–91269) were dealt with during the alignment of the Mathematics and Statistics standards with the NZC. The Mathematics and Statistics achievement standards have been revised to show that they align with the *Pāngarau whāinga paetae* within TMoA.

Achievement standards 2.15 and 2.16 (91764, 91765) were compared with the Level 2 NZC Mathematics and Statistics standards to ensure that there was no duplication with the existing English-medium standards.

Addressing credit parity

The credits allocated to the standards reflect the time required for the teaching and learning involved. Issues of credit parity for the *Pāngarau* standards 2.1–2.14 (91256–91269) were dealt with during the alignment of these standards with the NZC. Credit allocations for the proposed new standards 2.15 and 2.16 (91764 and 91765) were determined on the basis of one credit equalling ten notional hours of learning and assessment time.

External and internal assessment

The method of assessment for each standard best reflects the teaching and learning involved for each standard. Issues regarding the balance and appropriateness of internal and external assessment for standards 2.1–2.14 (91256–91269) were dealt with during the alignment of these standards with the NZC. Internal assessment was considered the most appropriate form of assessment for the two new standards, and this is consistent with similar standards (research and literacy) in other learning areas.

What has changed (summary)?

Mathematics and Statistics achievement standards aligned with outcomes from the New Zealand Curriculum (NZC) (2.1–2.14, 91256–91269) were interpreted into te reo Māori in line with the standard template for Māori-medium achievement standards.

Pāngarau 2.15 (91764) *Te whakahaere rangahau pāngarau* reflects the cross strand Te Whakamahinga o te Pāngarau, which aims to ensure that students are aware of the uses of Pāngarau and the origins of Pāngarau ideas. It also ensures that students are able to critically evaluate the use of Pāngarau across a range of contexts.

Pāngarau 2.16 (91765) *Te tātari i te reo motuhake o tētahi kōrero pāngarau* reflects the cross strand Te Reo Matatini o te Pāngarau, which focuses on the skills of communicating in Pāngarau in order to develop higher order thinking skills such as critical thinking, logical reasoning and creativity.

Pāngarau 2.16 (91765) is based on an alignment of the Pāngarau achievement objectives and the Literacy Progressions for Māori-medium students, and evidence of meeting the standard therefore is focussed on the three elements of Āheinga Reo, Puna Reo and Rautaki Reo.