

**Field Sciences****Revision to add an interpretation in Māori to *Mathematics and Statistics Level 3* achievement standards****Revised achievement standards (interpretations)**

<b>Domain</b>	<b>ID</b>	<b>Subject reference</b>
Algebra	91573, 91574, 91577, 91587	Mathematics and Statistics 3.1, 3.2, 3.5, 3.15
Calculus	91578, 91579	Mathematics and Statistics 3.6, 3.7
Geometry	91576	Mathematics and Statistics 3.4
Trigonometry	91575	Mathematics and Statistics 3.3
Probability	91585, 91586	Mathematics and Statistics 3.13, 3.14
Statistics	91580-91584	Mathematics and Statistics 3.8-3.12

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

**Date new versions published**

**November 2016**

**Planned review date**

**31 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 8 (NZQF Level 3) 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), 3.1-3.15 (91573-91587) were re-interpreted in te reo Māori in line with the standard template for Māori-medium achievement standards.
- The English-language versions of the standards have been amended to show that they also derive from achievement objectives in TMoA and the review date has been changed to 31 December 2018.

For a detailed description of the revision of, and the changes to, the **Mathematics and Statistics** 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	Credits
91573	Mathematics and Statistics 3.1	Apply the geometry of conic sections in solving problems <b>Te whakamahi i ngā tikanga āhuahanga o te motunga koeko</b>	3	3
91574	Mathematics and Statistics 3.2	Apply linear programming methods in solving problems <b>Te whakamahi tikanga mō te kauwhata whārite rārangi hei whakaoti rapanga</b>	3	3
91577	Mathematics and Statistics 3.5	Apply the algebra of complex numbers in solving problems <b>Te whakamahi tikanga taurangi o ngā tau hiato hei whakaoti rapanga</b>	3	5
91587	Mathematics and Statistics 3.15	Apply systems of simultaneous equations in solving problems <b>Te whakamahi whārite tukutahi mō ngā taurangi e toru hei whakaoti rapanga</b>	3	3

## Sciences &gt; Mathematics &gt; Calculus

ID	Ref	Title	Level	Credits
91578	Mathematics and Statistics 3.6	Apply differentiation methods in solving problems [Externally Assessed] <b>Te whakamahi tikanga kimi pārōnaki hei whakaoti rapanga [Externally Assessed]</b>	3	6
91579	Mathematics and Statistics 3.7	Apply integration methods in solving problems [Externally Assessed] <b>Te whakamahi tikanga kimi pāwhaitua hei whakaoti rapanga [Externally Assessed]</b>	3	6

## Sciences &gt; Mathematics &gt; Geometry

ID	Ref	Title	Level	Credits
91576	Mathematics and Statistics 3.4	Use critical path analysis in solving problems <b>Te whakamahi tikanga kimi ara tino whaitake hei whakaoti rapanga</b>	3	2

## Sciences &gt; Mathematics &gt; Trigonometry

ID	Ref	Title	Level	Credits
91575	Mathematics and Statistics 3.3	Apply trigonometric methods in solving problems <b>Te whakamahi tikanga pākoki hei whakaoti rapanga</b>	3	4

## Sciences &gt; Statistics and Probability &gt; Probability

ID	Ref	Title	Level	Credits
91585	Mathematics and Statistics 3.13	Apply probability concepts in solving problems [Externally Assessed] <b>Te whakamahi huatau tūponotanga hei whakaoti rapanga [Externally Assessed]</b>	3	4
91586	Mathematics and Statistics 3.14	Apply probability distributions in solving problems [Externally Assessed] <b>Te whakamahi tuari tūponotanga hei whakaoti rapanga [Externally Assessed]</b>	3	4

## Sciences &gt; Statistics and Probability &gt; Statistics

ID	Ref	Title	Level	Credits
91580	Mathematics and Statistics 3.8	Investigate time series data <b>Te tūhura i te raraunga houanga</b>	3	4
91581	Mathematics and Statistics 3.9	Investigate bivariate measurement data <b>Te tūhura i ngā taurangi matarua</b>	3	4

ID	Ref	Title	Level	Credits
91582	Mathematics and Statistics 3.10	Use statistical methods to make a formal inference <b>Te whakamahi tikanga tūhuratanga tauanga hei whakaputa hīkaro ōkawa</b>	3	4
91583	Mathematics and Statistics 3.11	Conduct an experiment to investigate a situation using experimental design principles <b>Te whakahaere whakamātau tauanga hei tūhura āhuatanga mā te whakamahi tikanga e whai wāhi ai ngā haukume</b>	3	4
91584	Mathematics and Statistics 3.12	Evaluate statistically based reports [Externally Assessed] <b>Te arotake i te pūrongo tauanga hei tātari i te whaihua o ngā whakapae [Externally Assessed]</b>	3	4

## Development of *Pāngarau* Level 3 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 3, Mathematics and Statistics achievement standards 3.1–3.15 (91573–91587) were interpreted into te reo Māori, in line with the standard template for Māori-medium achievement standards.

Unique new *Pāngarau* achievement standards were developed at Levels 1 and 2 to reflect the cross strands Te Reo Matatini o te *Pāngarau* and Te Whakamahinga o te *Pāngarau*. However, it was not deemed necessary to continue development in these areas at Level 3.

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 3.1–3.15 (91573–91587) 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.

### 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 3.1–3.15 (91573–91587) were dealt with during the alignment of these standards with the NZC.

### 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 3.1–3.15 (91573–91587) were dealt with during the alignment of these standards with the NZC.

**What has changed (summary)?**

Mathematics and Statistics achievement standards aligned with outcomes from the New Zealand Curriculum (NZC) 3.1–3.15 (91573–91587) were re-interpreted in te reo Māori in line with the standard template for Māori-medium achievement standards.