Aratohu kaiako
Kaiako guide

PAT Pāngarau | Mathematics

PAT Tau Whakahau | Rational number

PAT
PROGRESSIVE ACHIEVEMENT TEST

NZCER
Rangahau Mātauranga o Aotearoa

For questions or advice

E-mail assessmentservices@nzcer.org.nz
or call Assessment Services on (04) 802 1630

For support with school-wide data

E-mail educationadviser@nzcer.org.nz
or call Education Advisers on (04) 802 1386

Kia ora.

Thank you for taking the time to read this kaiako guide. It introduces the PAT Tau Whakahau | Rational Number assessment. A tool that is part of the PAT Pāngarau | Mathematics suite. This assessment explores ākonga understanding about fractions, decimals, percentages and reasoning with proportions. This guide supports you to understand how the information can be used in your teaching. It also outlines the thinking and vision behind the assessment.

The intention in developing a Progressive Achievement Test (PAT) focused on rational number is to support powerful learning for all ākonga in a critical area of the mathematics curriculum. By concentrating on one component of mathematics, this assessment enables kaiako to build a detailed picture of how their ākonga are progressing. Insights can then be used to inform classroom programmes and school-wide approaches to teaching and learning.

The Rational Number assessment is NZCER's first focused assessment of this kind. In the near future we to intend develop similar assessments that focus on other important areas of learning in mathematics and beyond.

We hope the Rational Number assessment is useful for all your ākonga and supports you to promote deep learning and strong kaiako–ākonga relationships.

Ngā mihi,

The NZCER Rational Number development team.

He mihi
Acknowledgements

We would like to gratefully acknowledge those who have been involved with the PAT Pāngarau | PAT Mathematics Rational Number development.

This project has been generously supported by the Williams Family Trust, and we extend our heartfelt thanks for committing to such important mahi.

We are grateful to our colleagues at Rangahau Mātauranga o Aotearoa | New Zealand Council for Educational Research (NZCER) who have contributed to this mahi.

Finally, we would like to express our sincere gratitude to ākonga and kaiako who participated in various phases of the development. We are grateful for your willingness to share your knowledge and experiences. This project would not have been possible without you all.

Ngā kai o roto | Contents

1. Te Aromatawai o Tau Whakahau PAT
PAT Rational number assessment

This guide has been developed to support kaiako and curriculum leaders to use the PAT Tau Whakahau| Rational Number assessment. The guide begins with a short explanation of the assessment's purpose and the domain of knowledge it assesses. It then provides some guidelines around how to use the assessment and interpret the results.

2. Te whāinga o te aromatawai
Purpose of the assessment

The Rational Number assessment is part of the Progressive Achievement Tests (PATs), a suite of standardised assessments developed by NZCER for learners in Aotearoa New Zealand. These research-based assessments are designed for use in English-medium contexts. The assessment spans multiple year levels, with achievement reported on measurement scales that are common across year levels.

The Rational Number assessment sits within PAT Pāngarau | Mathematics. PAT Pāngarau provides a broad measure of achievement across the mathematics and statistics learning area, while the Rational Number assessment examines a critical aspect of mathematics in depth. Together, these assessments offer both breadth (PAT Pāngarau) and depth (Rational Number) in understanding ākonga progress.

The Rational Number assessment is intended to be a low-stakes, formative tool. It is designed to support kaiako and curriculum leaders to:

- understand how ākonga, as individuals and in groups, are progressing in relation to rational number concepts
- identify patterns of strength and areas for further learning for individuals and groups
- make informed decisions about teaching approaches, programmes, and resources to support improved learning in rational number
- deepen their understanding of the knowledge and skills associated with increasing competence in rational number.

The Rational Number assessment should be used alongside other sources of information about each learner's achievement.

The Rational Number assessment is an online computer adaptive assessment. Ākonga answer approximately 30 questions that are automatically tailored to their level of achievement.

Most questions are in selected-response formats such as multiple-choice questions or drag and drop. There are also some short constructed-response questions. All questions are scored automatically.

Kaiako can use the NZCER Assist platform to generate a range of reports for individuals and groups based on ākonga responses to the Rational Number assessment. These reports can support interpretation and inform next teaching steps.

3. Ngā kai o roto i te aromatawai
Content of the assessment

The Rational Number assessment focuses on the big ideas involved in understanding and using rational numbers (see Table 1). It has been carefully designed to reflect the expectations for what ākonga should know, understand, and be able to do, as described in Phases 1 to 4 of the mathematics and statistics learning area of ***Te Mātaiaho | The New Zealand Curriculum***.

Within the mathematics learning area, rational number is recognised as a domain of knowledge and skills that includes fractions, decimals, percentages, and ratios.

According to The New Zealand Curriculum, rational number understanding develops progressively through the phases:

In **Phase 1 (Years 0–3)**, ākonga develop understanding of fractions as multiplicative part–whole relationships. They represent simple fractions, interpret numerators and denominators, compare and order fractions, and use them to describe parts of sets, regions, and measures. They add and subtract fractions with the same denominator and connect fractions to multiplication and division to find fractional parts and determine wholes.

In **Phase 2 (Years 4–6)**, ākonga extend multiplicative reasoning across fractions, decimals, and percentages. They understand decimals as base-10 fractions, represent and compare numbers to three decimal places, and convert between forms. They recognise equivalent fractions and mixed numbers, use common fraction–decimal–percentage equivalents, and add and subtract fractions and decimals. They use percentages to compare quantities to a whole, supporting emerging proportional reasoning.

In **Phase 3 (Years 7–8)**, ākonga strengthen connections between fractions, decimals, and percentages through more complex representations and operations. They work with powers of 10 and expanded form, add and subtract decimals and fractions with different denominators, and use multiple representations to compare, convert, and relate quantities. They apply proportional reasoning in problems involving percentages, ratios, and rates.

In **Phase 4 (Years 9–10)**, ākonga work flexibly with rational numbers, including recurring decimals, and reason about equivalence, density, and number line representation. They apply proportional reasoning in increasingly complex contexts, including rates and proportional change, and connect rational number understanding to algebraic representations and relationships. They use these ideas to interpret and solve problems across a range of real-world contexts.

4. Ngā whaitua aromatawai Tau Whakahau PAT
PAT Rational Number Assessment Domains

The content of the Rational Number assessment is organised into three analytically distinct but overlapping domains: Conceptual understanding, Operational reasoning, and Proportional reasoning.

Each domain highlights an important aspect of learning about rational numbers. Together, they provide a useful framework for kaiako to identify what ākonga know, understand, and can do.

Conceptual understanding involves the knowledge and understanding associated with rational numbers.

Operational reasoning focuses on using mathematical operations, such as addition and multiplication, to work with rational numbers.

Proportional reasoning involves applying rational numbers to compare and scale quantities, and to solve problems.

Together, these domains reflect the interconnected ways ākonga develop understanding of rational numbers, operate on rational quantities, and reason multiplicatively across contexts.

While analytically distinct, the three domains are developmentally interdependent. Conceptual understanding and operational reasoning provide important foundations for proportional reasoning, which represents the coordinated use of rational numbers to reason about relationships between quantities.

The assessment is designed so that ākonga are presented with questions from across all three domains. The domains are also used as a framework for reporting.

Table 1 provides further detail about each domain. The list of big ideas is not exhaustive, but highlights key aspects of learning within each domain.

Table 1: Domain focus for the Rational Number assessment

Domain	Focus	Big ideas
Domain 1: Conceptual Understanding	Understanding the structure and meaning of rational numbers.	• Recognise and use equivalence between rational numbers (e.g., 1/2 = 0.5 = 50%) • Understand fractions as part–whole relationships (parts of a whole or a set) • Understand the size of rational numbers, including ordering and placement on the number line • Understand the structure of rational numbers, including how numerators and denominators show multiplicative relationships, how decimal place value reflects base-ten scaling, and how percentages represent "per hundred" • Recognise that there are infinitely many rational numbers between any two numbers • Use benchmarks (such as 0, 1/2, and 1) to reason about size
Domain 2: Operational Reasoning with Rational Numbers	Reasoning about how operations act on rational quantities, and using this understanding to solve problems and interpret results in context.	• Understand that operations on rational numbers change quantities in predictable ways • Use addition and subtraction to combine or compare rational quantities • Use multiplication and division to scale quantities and interpret "how much of" • Predict and explain the effect of operations on the size of quantities • Judge whether answers are reasonable using benchmarks, estimation, and number sense

Domain	Focus	Big ideas
Domain 3: Proportional reasoning	Applying multiplicative thinking with rational numbers to compare and scale quantities and to solve problems	• Distinguish between additive and multiplicative situations • Work with situations where two quantities change, but stay in the same proportion • Use ratios, rates, and scale factors to describe and compare relationships • Understand and use percentages as a way of describing proportion • Use unit rates and scale factors to compare quantities • Represent proportional relationships using ratio tables and double number lines • Apply proportional reasoning across contexts, including geometry, probability, and algebra

Ētahi Āhuatanga o ngā Tau Whakahau
Aspects of Rational Number

The eight aspects of Rational Number represent the principal conceptual areas of rational number within the assessment. They provide a consistent way of organising and reporting assessment evidence across the Rational Number domains. Each assessment item is assigned to one primary aspect, although it may also involve concepts and reasoning associated with other aspects. As the aspects overlap conceptually, they should not be interpreted as separate or independent measures of achievement.

Rational Number Domain: Conceptual understanding

Aspect	Description
1. Part-whole (fractions and percentages)	This aspect focuses on understanding fractions as relationships between a whole and its equal parts. It includes: • identifying the whole • recognising unit and non-unit fractions • interpreting numerators and denominators • representing proper fractions, improper fractions and mixed numbers. Items may use regions, lengths, sets of objects or symbolic notation and may require students to connect a fraction with an appropriate visual or contextual representation.

Aspect	Description
2. Magnitude (fractions, decimals and percentages)	This aspect focuses on understanding the size and position of rational numbers. It includes: • comparing and ordering fractions, decimals and percentages • locating them on number lines • using benchmarks such as 0, one-half and 1 • interpreting decimal place value • estimating or rounding values appropriately. Successful performance requires attention to the value represented, rather than relying only on superficial features such as the number of digits or the sizes of denominators.
3. Equivalence and conversion	This aspect focuses on recognising that the same rational number can be represented in different ways. It includes: • generating and recognising equivalent fractions • simplifying fractions • converting among fractions, decimals and percentages • explaining or using the multiplicative relationships that make two representations equivalent. The emphasis is on preserving value while changing the form in which that value is expressed.

Rational Number Domain: Operational reasoning

Aspect	Description
4. Additive operations (fractions and decimals)	This aspect focuses on adding and subtracting fractions and decimals. It includes: • coordinating units • using equivalent fractions or common denominators • aligning decimal place values • regrouping where necessary • estimating whether an answer is reasonable. Items may involve symbolic calculations or contextual problems in which quantities are combined, separated or compared additively.
5. Operators on quantities (fractions and percentages)	This aspect focuses on using a fraction or percentage as an operator on a quantity. It includes: • finding a fractional or percentage part of a whole • finding the whole from a known part • determining how one quantity relates to another as a fraction or percentage. These items assess whether students can interpret expressions such as "three-quarters of", "25% of" or "12 is 30% of what number?" as multiplicative actions on quantities.

Aspect	Description
6. Multiplicative operations (fractions, decimals and percentages)	This aspect focuses on multiplying and dividing with fractions, decimals and percentages. It includes: • interpreting multiplication as scaling • interpreting division as sharing or measurement • working with reciprocals • calculating products and quotients involving rational numbers. The emphasis is on understanding what the operation means as well as carrying it out accurately, particularly when multiplication does not make a quantity larger or division does not make it smaller.

Rational Number Domain: Proportional reasoning

Aspect	Description
7. Rates and ratios	This aspect focuses on representing and interpreting multiplicative comparisons between quantities. It includes: • part-to-part and part-to-whole ratios • equivalent ratios, unit rates, and compound measures (e.g. cost per item, distance per unit of time or quantities in a mixture) . Items may require students to express, compare or calculate a rate or ratio while attending to the quantities and units involved.
8. Reasoning with proportions	This aspect focuses on reasoning about quantities that vary together in a multiplicative relationship. It includes: • scaling quantities up or down • finding missing values in proportional situations • distinguishing proportional from additive relationships • working with percentage increase or decrease • solving direct or inverse proportion problems. These items commonly require students to coordinate several pieces of information, select an appropriate multiplicative strategy and explain why the relationship is proportional.

5. Ngā aromatawai urutau
Adaptive assessments

PAT Mathematics Rational Number is a computer adaptive assessment. This means that a computer algorithm selects each question based on how well ākonga have answered previous questions.

Questions are drawn from a large pool of items and are targeted to the estimated achievement level of the ākonga. As the ākonga responds to more questions, this estimate becomes increasingly precise.

The adaptive algorithm also ensures that each ākonga receives questions from all three domains. This provides a balanced mix of questions across the domains within the assessment.

Ākonga must answer each question before moving on to the next. Because each response is used to select the next question, they cannot return to previous questions or change their answers.

The algorithm has been configured so that ākonga answer at least 30 questions. If ākonga answer a large number of questions incorrectly, the algorithm will finish the assessment before 30 questions have been administered.

6. Te whakahaere i te aromatawai tuihono
Administering the online assessment

Te takatū | Preparation

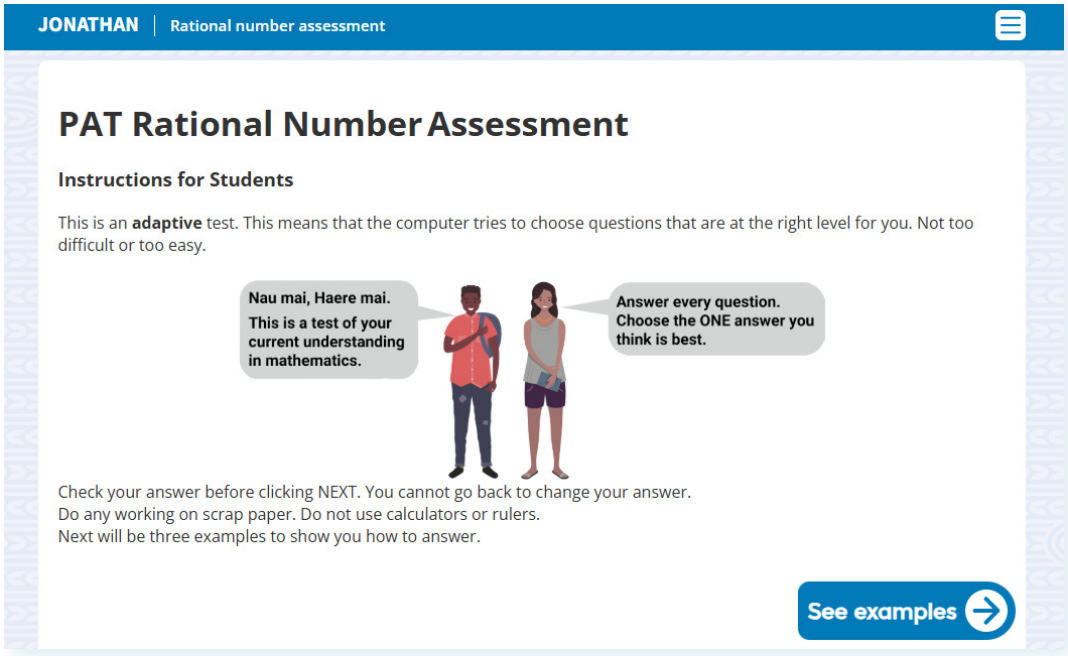
Ākonga access the Rational Number assessment through the NZCEROnline website using tokens generated on NZCER Assist. Before the assessment make sure you have generated the tokens and that ākonga have access to a suitable internet enabled device such as a laptop, iPad, tablet, or Chromebook.

It is recommended that kaiako preview the assessment prior to administering them with ākonga. Kaiako can preview the online assessment via the preview icon on the dashboard in NZCER Assist.

Te whakahaere i te aromatawai | Administering the assessment

Make sure all ākonga are comfortably seated.

Explain that they will be doing an online assessment about what they know and can do with numbers like fractions, decimals and percentages, and that it is important to try their best.

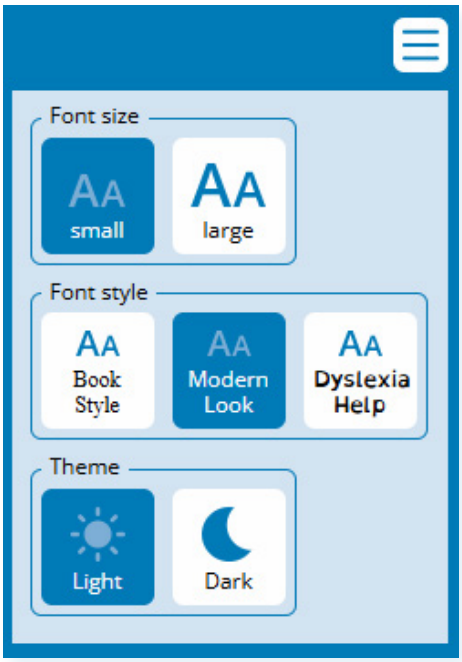


Give ākonga the URL (www.nzceronline.org.nz) and ensure everyone has found the site.

When everyone is ready, invite ākonga to log in with their tokens. Ākonga will be greeted with a welcome screen that asks them to confirm who they are (e.g. "Are you Tiana Baker?"). If the name on the screen is correct, ask ākonga to click the 'Yes' button. If the name on the screen is incorrect, check that they are using the correct token. Audio will be available on all questions after term 2 2026.

Read aloud the instructions provided on the next screen. Remind ākonga that they can click on the menu icon at the top right of the screen to choose options for:

- font (including dyslexic font)
- text size.



Ask the ākonga to click on the 'See examples' button. Work through each example with the ākonga. Check to see that they know how to respond to the different examples and can confirm their response by selecting the 'Next' button.

Emphasise to ākonga:

- You have to answer each question before you can move to the next question.
- Always choose the option you think is the best answer.
- Check you are happy with your answer before clicking 'Next'. Once you have clicked 'Next' you will not be able to go back to change your answer.
- Any working can be done on scrap paper, but calculators, rulers, or other supports cannot be used.
- Some of the questions have an audio option with a 'play' button. Ākonga can click on this button to have the question read to them.
- Karawhiua! Go for it!

Te tia haere i te aromatawai | Supervising the assessment

It is important to supervise the assessment in order to make sure that all ākonga have understood what to do and are working independently.

You are welcome to read questions to any ākonga having difficulty during the assessment. However, avoid explaining what the questions mean. If any ākonga have a great deal of difficulty understanding the instructions or questions, the assessment may not be suitable for them. Likewise, if an ākonga appears unusually stressed, do not continue with the assessment.

Te wā | Timing

Ākonga have up to **45 minutes to complete the questions**. The whole assessment, including administration, will take about **60 minutes** to complete. There is an online timer to support ākonga; however, it will **not** stop the assessment at the time allowance. It is up to kaiako to monitor the timing.

NZCER's piloting and trialling work has indicated that most ākonga finish the assessments within 45 minutes. However, kaiako and kura may make the decision to extend the time accommodation, depending on the purpose of using the assessments in their particular context.

Images, screen readers, and alt tags

All images have alt tags to describe their content for a screen reader. However not all assessment items are fully accessible: a number of assessment items require viewing of a graph or shape or other visual information source. These items rely on the visual recognition of an attribute, and such items cannot be described sufficiently for screen readers without changing the nature of the item. Some images are described with the term "illustration" to indicate that the images do not contain information required for the assessment item.

7. Te hoatu kaute me te whatmārama i ngā kitenga
Scoring and interpreting results

The rational number assessment generates four types of measures to summarise ākonga achievement on the assessment: raw scores; scale scores; progression levels; and reference measures.

Ngā tapeke taketake | Raw scores

The raw score is the number of questions answered correctly.

In general, raw scores have limited value, especially in a computer adaptive assessment. The assessment is designed so that most ākonga will answer around 60 percent of questions correctly, regardless of their level of achievement.

If an ākonga answers substantially more or fewer than 60 percent of questions correctly, this may indicate that they have not engaged consistently with the assessment, or that there are relatively few items in the question bank at their level.

Ngā kaute tauine | Scale score

Scale scores transform raw scores into a more meaningful measure of achievement. They place the achievement for an ākonga on a measurement scale that takes into account the difficulty of the questions they were given.

This means scale scores can be compared across assessments and over time, and can be interpreted in relation to group or national averages.

Scale scores typically range from about 10 to 110 and are reported as a range (for example, 60 ± 3). This range reflects measurement uncertainty and indicates how much the score might vary if the ākonga were to take an equivalent assessment. This is important, as no assessment is perfectly precise.

Ngā taumata kokenga whakamua | Progress levels

To support interpretation, the scale has been divided into a set of described progress levels. These indicate what ākonga at different points on the scale typically know, understand, and can do.

There are six progress levels: Beginning awareness, Early exploring, Exploring relationships, Developing understanding, Confident application, and Sophisticated exploring.

Each level is described in terms of the kinds of questions ākonga who score at that level are typically able to answer correctly at least two-thirds of the time. Taken together the descriptors provide a sense of how ākonga progress in rational numbers and what next learning steps might involve,

Table 2 shows how the progress levels relate to the scale, along with a description of each level.

Table 2: Progress levels for the Rational Number assessment

Level	Description
Beginning awareness Level 1 <40 units	Students scoring at this RN Stage can typically: ■ Recognise and name familiar fractions (e.g., ½, ⅓, ¼) and basic decimals (e.g., 0.5). ■ Identify simple percentages in real life (e.g., 50% off sales). ■ Match basic fractions to visual models (e.g., fraction circles, shaded grids). ■ Use doubling and halving to solve simple proportional problems. ■ Carry out *very simple, intuitive operations* involving fractional quantities ■ Show early decimal awareness by ordering or comparing simple one-decimal numbers (e.g., 38.1, 39.7, 40.2) using whole-number place-value reasoning, even without understanding decimals as fractions. ■ Locate halves, quarters, and simple tenths (e.g., 0.1, 0.5, 10%) on a number line. ***"I can shade ½ of a shape and find half or quarter of a small set (½ of 20 = 10)."*** ***"I know that 0.5 is 'half'".*** ***"I can put numbers like 38.1, 39.7, and 40.2 in order using whole number thinking."*** ***"I can add simple tenths in familiar contexts (e.g., 0.1 + 0.2)."***
Early Exploring Level 2 40-50 units	Students scoring at this RN Stage can typically: ■ Compare fractions with the **same denominator** and recognise simple equivalences (e.g., ½ = 50%). ■ Use **visual supports** (e.g., fraction walls, double number lines) to compare and show understanding of fractions, decimals and percentages. ■ Recognise simple multiplicative relationships when working with proportions. ■ Carry out simple procedures with familiar rational numbers, such as finding half or quarter of a number. ■ Order unit fractions. ■ Find a unit fraction of an amount (e.g.: ⅓ of 90). ■ Find 10 percent of an amount. ***"I can point to ¼ and ½ on a number line but need help placing ⅗."*** ***"I know that 25% is one-quarter but need help to compare 25% to 0.3."*** ***"I can work out that if 5 meters of fabric costs $10, 1 metre will cost $2."***

Level	Description
Exploring relationships **Level 3** **50-60 units**	Students scoring at this RN Stage can typically: ■ Locate **halves, thirds, quarters, fifths, tenths, and hundredths** (e.g., 0.25, 0.75, 20%) on a number line. ■ Compare fractions with **related denominators** and begin converting between **common** fractions, decimals, and percentages. ■ Add and subtract fractions with related denominators. ■ Find a fraction of an amount (e.g.:3/4 of 28) ***"I can place ⅗ on a number line and explain that 0.6 is "close to ½."*** ***"I can explain why ⅓ is smaller than ½ but might struggle to justify why ⅗ is bigger than ½."*** ***"I can add 0.2 and ⅕ by converting them to a common form."***
Developing understanding **Level 4** **60-70 units**	Students scoring at this RN Stage can typically: ■ Compare and order fractions with **different denominators** using equivalent fractions. ■ Locate **eighths, twelfths, and recurring decimals** (e.g., 0.333...) on a number line. ■ Add and subtract fractions with different denominators. ■ Find a fractional amount or simple percentage of a whole. ■ Convert between fractions, decimals, and percentages. ***"I can order a series of fractions like ⅓, ¼, and ⅖."*** ***"I can rewrite ⅗ as 60% and vice versa."*** ***"I can work out 20% of 80."*** ***"I can find a common denominator to add ⅔ and ¾."***
Confident application **Level 5** **70-80 units**	Students scoring at this RN Stage can typically: ■ Work flexibly and fluently with fractions (proper and improper), decimals, and percentages above 100%. ■ Carry out and explain the effects of multiplying and dividing with fractions and decimals. ■ Justify reasoning using multiple representations (e.g., number lines, bar models, equations). ***"I can explain why ⅔ × ¾ is smaller than ⅔, using diagrams or reasoning."*** ***"I can find a 15% discount on $250."***

Level	Description
Sophisticated reasoning **Level 6** **80+ units**	Students scoring at this RN Stage can typically: ■ Solve complex, multi-step problems using rational numbers. ■ Use proportional reasoning to solve real-world problems (e.g., "How many litres of paint are needed to cover 110 square meters if 3 litres covers 33 square meters?") ■ Work flexibly with **non-terminating decimals, recurring fractions, and complex percentage scenarios**. ***"I can explain why multiplying by a fraction between 0 and 1 results in a smaller number, using area models and proportional thinking."*** ***"I can solve a real-world problem involving layered percentages (e.g., a 20% discount followed by a 15% tax increase) and explains why order matters."*** ***"I can explain how to calculate the component of GST included in a total. For instance, if GST is 15% and the total cost of a product is $100 then the GST component is (100÷115) ×15."***

Ngā inenga tohutoro | Reference measures

The final type of measure reported by the Rational Number assessment is a reference measures.

A reference measure provides an average score or typical scoring range for a nationally representative group of ākonga. For example, the assessment can show how a scale score compares with the average score for a national sample of ākonga at each year level (Years 3–10) who completed the assessment in Term 1.

It is important to compare results with the appropriate reference group. In general, a scale score for an ākonga should be compared with the reference measure for their current year level.

If the assessment is administered later in the year (for example, in Term 4), it may be more appropriate to compare scores with the reference measure for the next year level. This reflects the progress ākonga are expected to make over the course of the year.

Ngā pūrongo | Reports

A range of reports are available online at NZCER Assist immediately after ākonga have completed their assessment. Several reports can be generated and each one provides a different perspective on ākonga achievement. For example:

- Individual reports—provide a detailed map of achievement across an assessment, including which questions were answered incorrectly and where the achievement level is best located on the scale.
- List reports—list results for a class or group
- Year group reports—show the distribution of scale scores for a year level with summary statistics

- Progress reports—examine progress scores for individuals and groups across two or more assessments and compare this with progress seen nationally
- Item reports—investigate how ākonga responded to individual items including which options they selected and how this compared with national response patterns.

8. Te Whakamahi i PAT Tau whakahau hei whakapiki it te pai o te whakaako me te ako Using PAT Rational number to improve teaching and learning

The Rational Number assessment is designed to provide rich information about how ākonga are developing their understanding of rational numbers. The results are most powerful when used formatively to inform teaching and learning at multiple levels—across classroom programmes, school programmes, and day-to-day teaching.

Kaiako can use the results to:

Inform classroom programmes and school-wide planning

- identify common strengths and areas for development across groups or cohorts
- review and adjust teaching programmes to ensure key ideas in rational number are addressed
- consider how rational number learning is sequenced within school schemes

Plan targeted teaching

- identify groups of ākonga with similar learning needs
- select teaching approaches, tasks, and resources that respond to those needs
- focus explicitly on the domains where further development is needed (e.g., strengthening conceptual understanding to support proportional reasoning)

Guide day-to-day teaching decisions

- use insights from the assessment to shape lesson planning and task design
- adjust the level of challenge in classroom activities
- provide opportunities for ākonga to revisit and consolidate key ideas

Support ākonga learning conversations

- use results to help ākonga understand their strengths and next steps
- set specific learning goals related to rational number understanding
- encourage reflection on strategies and reasoning

Understand the impact of teaching and interventions

- use results over time to evaluate the impact of teaching approaches, programmes, and interventions
- consider whether changes in practice are leading to improved outcomes for ākonga
- identify which approaches appear to be most effective for supporting learning in rational number

Use alongside other evidence

- interpret results in conjunction with classroom observations, ākonga work, and other assessments
- build a well-rounded picture of learning for each ākonga

NZCER
Rangahau Mātauranga o Aotearoa

**Rangahau Mātauranga o Aotearoa |
New Zealand Council for Educational Research**

facebook.com/nzcer
@NZCER
www.linkedin.com/company/new-zealand-council-for-educational-research