2024 NCEA Assessment Report

Subject: Numeracy

Unit standard: 32406

Report on individual unit standard

Unit standard 32406: Apply mathematics and statistics in a range of everyday situations

Assessment

In the Common Assessment Activity (CAA), all three outcomes were assessed by requiring candidates to answer question items based on a range of different contexts. The question items provided candidates with multiple opportunities to produce evidence against each outcome.

Outcome 1: Formulate mathematical and statistical approaches to solving problems in a range of everyday situations

1.1 Select an appropriate operation, representation, variable, and/or method to solve the problem(s).

This includes:

- selecting mathematical and statistical approaches that meet the demands of the situations
- interpreting questions correctly and checking to see that the answers address the questions.

Outcome 2: Use mathematics and statistics to meet the numeracy demands of a range of everyday situations

2.1 Apply mathematical and statistical procedures correctly in the situations.

This includes:

- calculating or reasoning correctly, including using calculators and verifying the reasonableness of answers.

Outcome 3: Explain mathematical and statistical responses to situations

3.1 Use evidence to explain the selection of the method and/or calculation.

This includes:

- taking a position in relation to a given situation (usually any position is accepted if it is explained adequately)
- explaining their position for a given situation using information provided in the problem
- persevering with the assessment, even if some problems seem difficult
- managing time adequately.

Summary

Areas of strength demonstrated by candidates who were clearly at, or above, the required standard in the Term 2 CAA demonstrated strengths in:

- locating the position of 225 million years ago on a timeline
- reading a line graph to determine the number of tuatara present, for a given year
- extending a visual growth pattern (1, 3, 7, 15, …) to find the total number of squares in the next term
- locating all the lines of reflection symmetry for a headband design
- applying the mass of one litre of water to find the mass of an empty water container
- finding the unit rate charge, given the total cost and amount used
- establishing which season had the highest rainfall, from a time series graph
- reading a line graph to determine the difference in attendance at Polyfest, for two given years
- using a timetable to compare the duration of two different types of performance
- calculating how many times heavier the tuatara is than the wētā, given the mass of both animals
- modelling how many tuatara will be born in 10 years, given the frequency of egg laying and the number of eggs per clutch
- interpreting the scale on a map to find the location of an offshore island
- selecting the top view that matches pictures of a sculpture
- calculating how many amounts of $1000 there are in $2,600,000
- interpreting a time given in hours and minutes and rounding it to the nearest hour
- calculating the number of 250 mL glasses that can be filled from three 1.5 L bottles
- using percentages to compare the amount of water in an adult pig with the amount of water in a piglet
- locating a probability of $\frac{2}{5}$ on a scale from 'impossible' to 'certain'
- using two visual displays to work out how many performers needed to move to change from one formation into another
- organising heights, expressed as decimals, in descending order
- explaining whether, or not, a dot plot of lengths given in mm, provides evidence for the presence of young tuatara
- comparing a cartoon image with normal proportions of human faces, using fractions
- interpreting a graphic about water usage to decide which measure saves the most water
- evaluating a claim about future numbers of attendees using evidence from a time series graph
- using rate (speed) to evaluate a claim about the average speed of a Rugby-7s player during a game
- explaining whether a captain should choose heads or tails for a future coin toss, given a record of three previous tosses
- using a data table to explain the correctness, or incorrectness, of a claim about the percentage of times NZ Sevens teams made Olympic finals.

Students who did not achieve the Numeracy standard in the Term 2 CAA demonstrated that they had difficulty in:

- selecting mathematical and statistical approaches that did not meet the demands of the situation
- interpreting the question correctly
- understanding the problem, as shown by not providing an answer or stating they did not know (IDK)
- calculating or reasoning correctly

- selecting a correct procedure
- taking a position in relation to a given situation (usually any position is accepted if it is justified)
- justifying their position to a given situation by doing more than just restating the claim.

Areas of strength demonstrated by candidates who were clearly at, or above, the required standard in the Term 3 CAA demonstrated strengths in:

- interpreting an evolution timeline (negative direction) to establish the coexistence of turtles and dinosaurs
- creating a statistical enquiry question based on the variables in a data table
- choosing the correct decimal for a one in 100 probability
- interpreting a bar graph of turtle sightings to evaluate a claim about possible extinction
- identifying the structure of a frieze pattern involving reflection and rotation
- solving a rate problem connecting turtle shell length and the amount of water needed in an aquarium
- calculating the rate of kilometres per minute from a digital display showing 12 minutes for 1 kilometre
- finding the percentage of a lesser price compared to a higher price, i.e. $24 as what percentage of $120
- identifying the reflective and rotational symmetry of a plate design
- using scale to select the diagram that showed the location of a bed in a room, given the dimensions of the bed and room in metres
- calculating the capacity of a glass jar, given the number of glasses of water it holds
- evaluating a claim by interpreting a time-series graph of percentage of New Zealanders buying from op shops
- applying a rate in ‘pipi per hour’ to find the time needed to collect 150 pipi
- extending a tide timetable to establish the time of a low tide
- working with a 3:5 ratio to calculate the amount of one ingredient given the amount of the other ingredient
- reading a linear scale (ruler) to establish whether, or not, a snapper meets minimum size requirements
- interpreting a dot plot of snapper lengths to evaluate a probabilistic claim
- applying a rate for the amount of petrol per amount of oil (50:1)
- calculating the cost of five driving lessons with a 30% discount
- using information and a scale diagram to establish whether, or not, a car is parked 6 metres from a corner
- interpreting a graph representing the relationship between speed and stopping distance
- using fractions of a fuel gauge to estimate the amount of petrol needed to fill a tank
- choosing which decimal fraction represents part of a car journey
- converting a tally chart to part-whole percentages to critique a probabilistic claim
- finding the categories in a pie chart that add to two thirds of the data
- applying a 5:2 ratio to calculate how many of one type of candle are made, given the total number
- evaluating a claim about volumes of rectangular prisms
- finding the unit cost for one candle from costs for 84 candles
- choosing which net folds to form a given box
- calculating the better of two deals, with one deal involving a 30% discount.

Students who did not achieve the Numeracy standard in the Term 3 CAA demonstrated that they had difficulty in:

- connecting a range of realistic contexts from everyday life with the mathematics and statistics used across these contexts
- interpreting and making decisions from infographic representations, particularly numeric scales and graphs
- reflecting on the reasonableness of calculated answers and measurements, to consider whether the answers make sense in the context
- considering the relative size of large whole numbers, integers, and decimals
- working with rates and ratios, particularly using ratio tables, finding the scalars (multipliers and divisors) between quantities, and the part-whole relationships in ratios as fractions and percentages
- understanding and using basic units of measurement, especially conversions between units, and units of area, capacity, and volume
- working with scale drawings and maps
- identifying reflective and rotational symmetry
- interpreting dot plots, particularly the meaning of medians, and time-series graphs to identify trends
- writing questions that can be answered statistically from given data sets
- anticipating the viability of nets for given solids
- taking a mathematical or statistical position, constructing arguments using the available information, and supporting explanations with appropriate calculations.