Level description: Year 8

In Year 8, learning in Mathematics builds on each student's prior learning and experiences. Students engage in a range of approaches to learning and doing mathematics that develop their understanding of and fluency with concepts, procedures and processes by making connections, reasoning, problem-solving and practice. Proficiency in mathematics enables students to respond to familiar and unfamiliar situations by employing mathematical strategies to make informed decisions and solve problems efficiently. Students further develop proficiency and positive dispositions towards mathematics and its use as they:

• extend computation with combinations of the 4 operations with integers and positive rational numbers , recognise the relationship between fractions and their terminating or infinite recurring decimal expansions; they convert between fraction and decimal forms of rational numbers and locate them on the real number line

• extend the exponent laws to numerical calculations involving positive and zero exponents , and solve a broad range of practical problems, using mental methods, written algorithms and digital tools

• use mathematical modelling to solve problems in a broad range of contexts that involve ratios with 2 or more terms, percentage increase and decrease, proportions with decimal values, and rates in measurement contexts , and apply proportional reasoning

• manipulate linear and other algebraic expressions , recognise and model situations using linear relations and solve related equations using tables, graphs and algebra

• interpret and explain demonstrations and proofs of Pythagoras' theorem and investigate irrational numbers , their infinite non-recurring decimal expansion and their approximate location on the real number line

• select metric measurement units fit for purpose, convert between units , recognising the effects of different levels of measurement accuracy on the results of computations , and relate these to interval estimates for measurements in various contexts

• apply knowledge of the relationships between π and the features of circles to solve problems involving circumference and area and establish sets of congruency and similarity conditions for common shapes in the plane and create algorithms to test for these conditions, discuss examples and counterexamples

• construct and locate objects with reference to three-dimensional coordinates using digital tools

• consider a variety of situations involving complementary and mutually exclusive events , combinations of 2 events ; represent these using tables and diagrams, conducting simulations and calculating corresponding probabilities

• examine experimental and observational data and identify populations and samples with respect to context ; investigate variation in summary statistics across samples of varying size and discuss their findings.

Achievement standard: Year 8

By the end of Year 8, students recognise irrational numbers and terminating or recurring decimals. They apply the exponent laws to calculations with numbers involving positive integer exponents. Students solve problems involving the 4 operations with integers and positive rational numbers. They use mathematical modelling to solve practical problems involving ratios, percentages and rates in measurement and financial contexts. Students apply algebraic properties to rearrange, expand and factorise linear expressions. They graph linear relations and solve linear equations with rational solutions and one-variable inequalities, graphically and algebraically. Students use mathematical modelling to solve problems using linear relations, interpreting and reviewing the model in context. They make and test conjectures involving linear relations using digital tools.

Students use appropriate metric units when solving measurement problems involving the perimeter and area of composite shapes, and volume of right prisms. They use Pythagoras' theorem to solve measurement problems involving unknown lengths of right-angle triangles. Students use formulas to solve problems involving the area and circumference of circles.

They solve problems of duration involving 12- and 24-hour cycles across multiple time zones. Students use 3 dimensions to locate and describe position. They identify conditions for congruency and similarity in shapes and create and test algorithms designed to test for congruency and similarity. Students apply the properties of quadrilaterals to solve problems.

They conduct statistical investigations and explain the implications of obtaining data through sampling. Students analyse and describe the distribution of data. They compare the variation in distributions of random samples of the same and different size from a given population with respect to shape, measures of central tendency and range. Students represent the possible combinations of 2 events with tables and diagrams, and determine related probabilities to solve practical problems. They conduct experiments and simulations using digital tools to determine related probabilities of compound events.