Reach. | ICAS.

Mathematics
Assessment Framework

The questions increase in complexity throughout the paper and encourage the use of higher-order thinking skills.

INTRODUCTORY PAPER

NUMBER & ARITHMETIC	ALGEBRA & PATTERNS	MEASURES & UNITS	SPACE & GEOMETRY	CHANCE & DATA

QUESTIONS MAY REQUIRE STUDENTS TO:

NUMBER	PATTERNS	MEASURES	SPACE	CHANCE
• count, order and compare whole numbers to 100 • skip by 2s, 5s, and 10s • understand place value of whole numbers to 100 and position numbers on the number line • recognise halves and wholes	• continue simple linear patterns with numbers and shapes	• informally measure and compare mass, length, area, volume and capacity • measure and compare time in hours, days, weeks, months and years	• give and follow directions • identify relative position on a picture or map	• give simple estimates of probability in terms of what will happen, might happen and won't happen

ARITHMETIC	PRE-ALGEBRA	UNITS	SHAPE	DATA
• use the four operations with single digits using stimulus for multiplication and division • add and subtract by counting on, partitioning and rearranging • solve number problems involving whole numbers to 100	• solve simple number puzzles expressed in words or symbols	• no formal units at this level	• recognise and classify basic shapes and solids using obvious features • identify shapes that are the same, similar or different	• complete a basic table • read a basic table with frequencies and tallies • read a picture graph

	ALGEBRA	MEASUREMENT	GEOMETRY	
	• not tested at this level	• read analog and digital clocks to the half hour	• not tested at this level	

ICAS assessments

Mathematics
Assessment Framework

Reach. | **ICAS.**

The questions increase in complexity throughout the paper and encourage the use of higher-order thinking skills.

PAPER A

NUMBER & ARITHMETIC	ALGEBRA & PATTERNS	MEASURES & UNITS	SPACE & GEOMETRY	CHANCE & DATA

QUESTIONS MAY REQUIRE STUDENTS TO:

NUMBER	PATTERNS	MEASURES	SPACE	CHANCE
• count, order and compare whole numbers to 1000 • place value of whole numbers to 1000 • skip by 2s, 3s, 5s and 10s • order and compare halves, quarters and eighths	• continue simple linear patterns with numbers and shapes • identify missing elements in a pattern	• informally measure and compare mass, length, area, volume and capacity • order months and seasons • read a calendar	• give and follow directions • identify relative position on a picture or map • identify image after one-step flip, slide and half or quarter turns	• give simple estimates of probability in terms of likelihood

ARITHMETIC	PRE-ALGEBRA	UNITS	SHAPE	DATA
• multiply and divide by single digits using repeated addition, arrays or groups • solve simple addition and subtraction problems	• solve simple number puzzles expressed in words or symbols • complete number sentences involving addition and subtraction	• no formal units at this level	• describe 2-D and 3-D shapes • identify shapes or solids that are the same or different	• classify data • interpret lists, tables and picture graphs • complete a basic table

	ALGEBRA	MEASUREMENT	GEOMETRY	
	• not tested at this level	• read analog and digital clocks to the quarter hour	• not tested at this level	

D15 - 191220

ICAS assessments

Reach. | ICAS.

Mathematics
Assessment Framework

The questions increase in complexity throughout the paper and encourage the use of higher-order thinking skills.

PAPER B

NUMBER & ARITHMETIC	ALGEBRA & PATTERNS	MEASURES & UNITS	SPACE & GEOMETRY	CHANCE & DATA

QUESTIONS MAY REQUIRE STUDENTS TO:

NUMBER	PATTERNS	MEASURES	SPACE	CHANCE
• count, order and compare whole numbers to 10 000 • understand place value of whole numbers to 10 000 • recognise odd and even numbers		• estimate, order, measure and compare mass, length, and capacity	• identify pathways and interpret grid maps for relative position • identify axes of symmetry	• count the number of arrangements of sets of objects and events
ARITHMETIC	**PRE-ALGEBRA**	**UNITS**	**SHAPE**	**DATA**
• solve problems involving unit fractions with denominators of 2, 3, 5 and 10 • multiply and divide by 2, 3, 5 and 10 • use informal factors and multiples of whole numbers to solve problems • add and subtract to 100	• complete number sentences involving the four operations	• use familiar metric units such as cm, m, km, g, kg, L and mL	• identify nets and elevations of 3-D shapes	• read and interpret bar charts, a range of common graphs and two-way tables
	ALGEBRA	**MEASUREMENT**	**GEOMETRY**	
	• not tested at this level	• read analog and digital clocks • calculate areas and perimeters using a grid	• recognise angles as measures of turn • order and compare angles	

ICAS assessments

The questions increase in complexity throughout the paper and encourage the use of higher-order thinking skills.

PAPER C

NUMBER & ARITHMETIC	ALGEBRA & PATTERNS	MEASURES & UNITS	SPACE & GEOMETRY	CHANCE & DATA

QUESTIONS MAY REQUIRE STUDENTS TO:

NUMBER	PATTERNS	MEASURES	SPACE	CHANCE
• count, order and compare numbers from 0.01 to 100 000 • understand place value of numbers from 0.01 to 100 000 • count by halves, thirds, quarters, tenths and hundredths	• sequence numbers in multiples of 2 to 10	• use scaled instruments to measure and compare quantities, temperatures and lengths	• use scales, legends and directions to interpret maps • complete symmetrical patterns	• order likelihood of events • recognise complementary and independent events

ARITHMETIC	PRE-ALGEBRA	UNITS	SHAPE	DATA
• solve problems involving equivalent fractions • convert decimals to fractions • use all number facts to 100	• solve complex number puzzles expressed in words	• select appropriate metric units • choose appropriate order of magnitude • convert time	• informally compare areas of composite or irregular shapes	• select and interpret data appropriate display • interpret line graphs

	ALGEBRA	MEASUREMENT	GEOMETRY	
	• not tested at this level	• compare areas and perimeters using a grid • solve time problems involving am and pm	• compare angles less than 180°	

ICAS assessments

Reach. ICAS.

Mathematics
Assessment Framework

The questions increase in complexity throughout the paper and encourage the use of higher-order thinking skills.

PAPER D

NUMBER & ARITHMETIC	ALGEBRA & PATTERNS	MEASURES & UNITS	SPACE & GEOMETRY	CHANCE & DATA

QUESTIONS MAY REQUIRE STUDENTS TO:

NUMBER	PATTERNS	MEASURES	SPACE	CHANCE
• round numbers • compare and order fractions and decimals and locate them on the number line	• continue and describe patterns involving fractions, decimals and whole numbers	• convert metric units of length	• connect 3-D objects with 2-D views and nets • use grid reference and directional language • identify line and rotational symmetry	• list sample space • represent probabilities as fractions • recognise probabilities lie from 0 to 1

ARITHMETIC	PRE-ALGEBRA	UNITS	SHAPE	DATA
• use factors and multiples to solve problems • solve problems involving long multiplication and division with remainders • solve problems involving fractions, mixed numerals and whole numbers • estimate products	• complete equivalent number sentences involving all four operations	• choose and use appropriate metric units		• interpret and compare column graphs, dot plots and tables

	ALGEBRA	MEASUREMENT	GEOMETRY	
	• not tested at this level	• calculate areas and perimeters of rectangles • convert 24-hour time	• measure and compare angles • solve problems involving parallel and perpendicular lines	

D5 - 191220

ICAS assessments

Reach. | ICAS.

Mathematics
Assessment Framework

The questions increase in complexity throughout the paper and encourage the use of higher-order thinking skills.

PAPER E

NUMBER & ARITHMETIC	ALGEBRA & PATTERNS	MEASURES & UNITS	SPACE & GEOMETRY	CHANCE & DATA

QUESTIONS MAY REQUIRE STUDENTS TO:

NUMBER	PATTERNS	MEASURES	SPACE	CHANCE
• identify and apply properties of prime, composite, square and triangular numbers • convert between fractions, decimals and percentages	• continue a pattern of related fractions	• convert metric units of area and volume	• apply combinations of transformations to an image • use the cartesian plane to represent points	• represent probabilities as decimals and percentages • compare experimental and expected frequencies

ARITHMETIC	PRE-ALGEBRA	MEASUREMENT	GEOMETRY	DATA
• order integers • solve problems involving order of operations including decimals and fractions • add and subtract related fractions • find fractions of whole numbers • solve percentage problems such as discounts	• complete equivalent number sentences involving order of operations	• calculate areas and perimeters of composite shapes including triangles • interpret timetables	• apply angle properties including complementary, supplementary, vertically opposite angles and angles at a point • solve problems involving the angle sum of a triangle	• interpret and compare double column graphs • interpret sector graphs

ALGEBRA

• not tested at this level

D15 - 191220

ICAS
assessments

Reach. | ICAS.

Mathematics
Assessment Framework

The questions increase in complexity throughout the paper and encourage the use of higher-order thinking skills.

PAPER F

NUMBER & ARITHMETIC	ALGEBRA & PATTERNS	MEASURES & UNITS	SPACE & GEOMETRY	CHANCE & DATA

QUESTIONS MAY REQUIRE STUDENTS TO:

NUMBER	PATTERNS	MEASURES	SPACE	CHANCE
• use index notation • represent numbers as product of primes • find squares and square roots • compare and order integers and unrelated fractions • round decimals	• continue patterns involving powers, integers and unrelated fractions		• use simple bearings • plot and identify co-ordinates in all four quadrants	

ARITHMETIC	PRE-ALGEBRA	MEASUREMENT	SHAPE	DATA
• use order of operations with integers and unrelated fractions • solve ratio problems • express one quantity as a percentage or fraction of another		• use formulae to calculate areas of triangles and parallelograms • calculate volumes of rectangular prisms	• classify and use properties of triangles and quadrilaterals	• interpret and compare stem and leaf plots, and dot plots • calculate mean, median, mode and range

	ALGEBRA		GEOMETRY	
	• create and evaluate algebraic equations using substitution • interpret authentic graphs and solve linear equations • simplify expressions		• calculate angles between transversals and parallel lines • use angle sum of quadrilaterals to solve problems	

D15 - 191220

ICAS assessments

The questions increase in complexity throughout the paper and encourage the use of higher-order thinking skills.

PAPER G

NUMBER & ARITHMETIC	ALGEBRA & PATTERNS	MEASURES & UNITS	SPACE & GEOMETRY	CHANCE & DATA

QUESTIONS MAY REQUIRE STUDENTS TO:

NUMBER	PATTERNS	MEASURES	SPACE	CHANCE
• apply index laws involving positive and zero indices • convert terminating and recurring decimals to fractions	• continue patterns involving recurring decimals			• calculate probabilities of events involving 'and', 'or' and 'at least'

ARITHMETIC	ALGEBRA	MEASUREMENT	SHAPE	DATA
• use order of operations with integers and rational numbers • solve ratio and rates problems	• expand and simplify expressions • factorise linear expressions • solve linear equations graphically and algebraically • change the subject of a formula	• calculate areas and perimeters of a kite, rhombus and trapezium • calculate area of composite shapes • calculate circumference and areas of circles • calculate volumes and surface areas of right prisms • apply Pythagoras' Theorem to solve right-triangle problems	• use angle properties of shapes	• interpret two-way tables, Venn diagrams and frequency histograms • recognise effect of outliers on measures of location and spread

			GEOMETRY	
			• apply congruence conditions for triangles to solve problems • use ratio and scale factor of similar figures • apply angle sum of polygons to solve problems	

ICAS assessments

The questions increase in complexity throughout the paper and encourage the use of higher-order thinking skills.

PAPER H

NUMBER & ARITHMETIC	ALGEBRA & PATTERNS	MEASURES & UNITS	SPACE & GEOMETRY	CHANCE & DATA

QUESTIONS MAY REQUIRE STUDENTS TO:

NUMBER
- apply index laws involving integer indices
- convert numbers to scientific notation

ALGEBRA
- apply index laws to simplify expressions
- expand and simplify binomials
- factorise quadratics
- calculate midpoints, distance, gradient and find the equation of a line
- solve linear simultaneous equations
- solve problems involving parallel and perpendicular lines
- graph parabolas, hyperbolae, polynomials, exponentials and circles
- solve quadratic equations

MEASURES
- solve problems with very small time scales and intervals

SPACE
- solve problems involving bearings, depression, elevation and area in right angled triangles

CHANCE
- use two-step probability with and without replacement
- calculate relative frequencies

ARITHMETIC
- solve problems involving simple interest
- operate on surds

MEASUREMENT
- calculate surface area and volume of cylinders, cones, spheres and right pyramids

GEOMETRY
- find unknown sides and angles in right angled triangles using the sine, cosine and tangent ratios

DATA
- interpret and compare back-to-back stem and leaf plots, and cumulative frequency histograms
- compare displays using measures of location and spread
- interpret box plots and scatterplots
- identify quartiles
- describe distributions

ICAS assessments

The questions increase in complexity throughout the paper and encourage the use of higher-order thinking skills.

PAPERS I & J (ICAS ONLY)

NUMBER & ARITHMETIC	ALGEBRA & PATTERNS	MEASURES & UNITS	SPACE & GEOMETRY	CHANCE & DATA

QUESTIONS MAY REQUIRE STUDENTS TO:

NUMBER
- apply index laws involving integer and fractional indices
- convert numbers to scientific notation

ALGEBRA
- apply index laws to simplify expressions
- expand and simplify binomials
- substitute and rearrange to solve equations
- factorise quadratics
- calculate midpoints, distance and gradient
- solve linear inequalities and graph solutions on number lines
- solve linear simultaneous equations
- solve problems involving parallel and perpendicular lines
- graph transformations of parabolas, hyperbolae, polynomials and circles

MEASURES
- solve problems with very small time scales and intervals

SPACE
- solve problems involving bearings, depression, elevation and area

CHANCE
- use two-step probability with and without replacement
- calculate relative frequencies
- calculate probabilities involving 'and' and 'or'
- solve problems involving conditional probability

ARITHMETIC
- solve problems involving simple and compound interest
- operate on surds

MEASUREMENT
- calculate areas of composite shapes
- calculate surface area and volume of cylinders, cones, spheres and right pyramids

GEOMETRY
- use trigonometry to solve 3-D problems
- find unknown sides and angles using sine and cosine rules

DATA
- interpret and compare back-to-back stem and leaf plots, and histograms
- compare displays using measures of location and spread
- interpret box plots and scatterplots
- identify quartiles
- describe distributions

D15 - 191220

ICAS assessments