



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

- 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

PATTERNS

- continue simple linear patterns with numbers and shapes

MEASURES

- informally measure and compare mass, length, area, volume and capacity
- measure and compare time in hours, days, weeks, months and years

SPACE

- give and follow directions
- identify relative position on a picture or map

CHANCE

- give simple estimates of probability in terms of what will happen, might happen and won't happen

ARITHMETIC

- 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

PRE-ALGEBRA

- solve simple number puzzles expressed in words or symbols

UNITS

- no formal units at this level

SHAPE

- recognise and classify basic shapes and solids using obvious features
- identify shapes that are the same, similar or different

DATA

- complete a basic table
- read a basic table with frequencies and tallies
- read a picture graph

ALGEBRA

- not tested at this level

MEASUREMENT

- read analog and digital clocks to the half hour

GEOMETRY

- not tested at this level



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PAPER A**NUMBER & ARITHMETIC****ALGEBRA & PATTERNS****MEASURES & UNITS****SPACE & GEOMETRY****CHANCE & DATA****QUESTIONS MAY REQUIRE STUDENTS TO:****NUMBER**

- 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

PATTERNS

- continue simple linear patterns with numbers and shapes
- identify missing elements in a pattern

MEASURES

- informally measure and compare mass, length, area, volume and capacity
- order months and seasons
- read a calendar

SPACE

- give and follow directions
- identify relative position on a picture or map
- identify image after one-step flip, slide and half or quarter turns

CHANCE

- give simple estimates of probability in terms of likelihood

ARITHMETIC

- multiply and divide by single digits using repeated addition, arrays or groups
- solve simple addition and subtraction problems

PRE-ALGEBRA

- solve simple number puzzles expressed in words or symbols
- complete number sentences involving addition and subtraction

UNITS

- no formal units at this level

SHAPE

- describe 2-D and 3-D shapes
- identify shapes or solids that are the same or different

DATA

- classify data
- interpret lists, tables and picture graphs
- complete a basic table

ALGEBRA

- not tested at this level

MEASUREMENT

- read analog and digital clocks to the quarter hour

GEOMETRY

- not tested at this level



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PAPER B

NUMBER & ARITHMETIC

ALGEBRA & PATTERNS

MEASURES & UNITS

SPACE & GEOMETRY

CHANCE & DATA

QUESTIONS MAY REQUIRE STUDENTS TO:

NUMBER

- count, order and compare whole numbers to 10 000
- understand place value of whole numbers to 10 000
- recognise odd and even numbers

PRE-ALGEBRA

- complete number sentences involving the four operations

MEASURES

- estimate, order, measure and compare mass, length, and capacity

SPACE

- identify pathways and interpret grid maps for relative position
- identify axes of symmetry

CHANCE

- count the number of arrangements of sets of objects and events

ARITHMETIC

- 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

ALGEBRA

- not tested at this level

UNITS

- use familiar metric units such as cm, m, km, g, kg, L and mL

SHAPE

- identify nets and elevations of 3-D shapes

DATA

- read and interpret bar charts, a range of common graphs and two-way tables

MEASUREMENT

- read analog and digital clocks
- calculate areas and perimeters using a grid

GEOMETRY

- recognise angles as measures of turn
- order and compare angles



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PAPER C**NUMBER & ARITHMETIC****ALGEBRA & PATTERNS****MEASURES & UNITS****SPACE & GEOMETRY****CHANCE & DATA****QUESTIONS MAY REQUIRE STUDENTS TO:****NUMBER**

- 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

PATTERNS

- sequence numbers in multiples of 2 to 10

MEASURES

- use scaled instruments to measure and compare quantities, temperatures and lengths

SPACE

- use scales, legends and directions to interpret maps
- complete symmetrical patterns

CHANCE

- order likelihood of events
- recognise complementary and independent events

ARITHMETIC

- solve problems involving equivalent fractions
- convert decimals to fractions
- use all number facts to 100

PRE-ALGEBRA

- solve complex number puzzles expressed in words

UNITS

- select appropriate metric units
- choose appropriate order of magnitude
- convert time

SHAPE

- informally compare areas of composite or irregular shapes

DATA

- select and interpret data appropriate display
- interpret line graphs

ALGEBRA

- not tested at this level

MEASUREMENT

- compare areas and perimeters using a grid
- solve time problems involving am and pm

GEOMETRY

- compare angles less than 180°



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PAPER D

NUMBER & ARITHMETIC

ALGEBRA & PATTERNS

MEASURES & UNITS

SPACE & GEOMETRY

CHANCE & DATA

QUESTIONS MAY REQUIRE STUDENTS TO:

NUMBER

- round numbers
- compare and order fractions and decimals and locate them on the number line

PATTERNS

- continue and describe patterns involving fractions, decimals and whole numbers

MEASURES

- convert metric units of length

SPACE

- connect 3-D objects with 2-D views and nets
- use grid reference and directional language
- identify line and rotational symmetry

CHANCE

- list sample spaces
- represent probabilities as fractions
- recognise probabilities lie from 0 to 1

ARITHMETIC

- 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

PRE-ALGEBRA

- complete equivalent number sentences involving all four operations

UNITS

- choose and use appropriate metric units

GEOMETRY

- measure and compare angles
- solve problems involving parallel and perpendicular lines

DATA

- interpret and compare column graphs, dot plots and tables

ALGEBRA

- not tested at this level

MEASUREMENT

- calculate areas and perimeters of rectangles
- convert 24-hour time



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PAPER E**NUMBER & ARITHMETIC****ALGEBRA & PATTERNS****MEASURES & UNITS****SPACE & GEOMETRY****CHANCE & DATA****QUESTIONS MAY REQUIRE STUDENTS TO:****NUMBER**

- identify and apply properties of prime, composite, square and triangular numbers
- convert between fractions, decimals and percentages

PATTERNS

- continue a pattern of related fractions

MEASURES

- convert metric units of area and volume

SPACE

- apply combinations of transformations to an image
- use the cartesian plane to represent points

CHANCE

- represent probabilities as decimals and percentages
- compare experimental and expected frequencies

ARITHMETIC

- 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

PRE-ALGEBRA

- complete equivalent number sentences involving order of operations

MEASUREMENT

- calculate areas and perimeters of composite shapes including triangles
- interpret timetables

GEOMETRY

- apply angle properties including complementary, supplementary, vertically opposite angles and angles at a point
- solve problems involving the angle sum of a triangle

DATA

- interpret and compare double column graphs
- interpret sector graphs

ALGEBRA

- not tested at this level



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PAPER F**NUMBER & ARITHMETIC****ALGEBRA & PATTERNS****MEASURES & UNITS****SPACE & GEOMETRY****CHANCE & DATA****QUESTIONS MAY REQUIRE STUDENTS TO:****NUMBER**

- use index notation
- represent numbers as product of primes
- find squares and square roots
- compare and order integers and unrelated fractions
- round decimals

PATTERNS

- continue patterns involving powers, integers and unrelated fractions

MEASUREMENT

- use formulae to calculate areas of triangles and parallelograms
- calculate volumes of rectangular prisms

SPACE

- use simple bearings
- plot and identify co-ordinates in all four quadrants

DATA

- interpret and compare stem and leaf plots, and dot plots
- calculate mean, median, mode and range

ARITHMETIC

- use order of operations with integers and unrelated fractions
- solve ratio problems
- express one quantity as a percentage or fraction of another

ALGEBRA

- create and evaluate algebraic equations using substitution
- interpret authentic graphs and solve linear equations
- simplify expressions

SHAPE

- classify and use properties of triangles and quadrilaterals

GEOMETRY

- calculate angles between transversals and parallel lines
- use angle sum of quadrilaterals to solve problems





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PAPER G

NUMBER & ARITHMETIC

ALGEBRA & PATTERNS

MEASURES & UNITS

SPACE & GEOMETRY

CHANCE & DATA

QUESTIONS MAY REQUIRE STUDENTS TO:

NUMBER

- apply index laws involving positive and zero indices
- convert terminating and recurring decimals to fractions

PATTERNS

- continue patterns involving recurring decimals

MEASUREMENT

- calculate areas and perimeters of a kite, rhombus and trapezium
- calculate areas 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

SHAPE

- use angle properties of shapes

CHANCE

- identify complementary events and use the sum of probabilities to solve problems
- calculate probabilities of events involving 'and', 'or' and 'at least'

ARITHMETIC

- use order of operations with integers and rational numbers
- solve ratio and rates problems

ALGEBRA

- expand and simplify expressions
- factorise linear expressions
- solve linear equations graphically and algebraically
- change the subject of a formula

GEOMETRY

- apply congruence conditions for triangles to solve problems
- find the angle sum of a polygon

DATA

- interpret two-way tables, Venn diagrams and frequency histograms
- recognise effect of outliers on measures of location and spread



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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

ARITHMETIC

- solve problems involving simple interest

ALGEBRA

- apply index laws to simplify expressions
- expand and simplify binomials
- factorise monic quadratic expressions
- 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 monic quadratic equations with integer roots

MEASURES

- solve problems with very small time scales and intervals
- determine percentage errors in measurements

MEASUREMENT

- calculate surface area and volume of cylinders, cones, spheres and right pyramids
- solve problems involving direct proportion
- use ratio and scale factor of similar figures
- solve problems involving bearings, and angles of elevation and depression

SPACE

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

GEOMETRY

- apply similarity conditions for triangles to solve problems

CHANCE

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

DATA

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

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PAPERS I & J (ICAS ONLY)

NUMBER & ARITHMETIC

ALGEBRA & PATTERNS

MEASURES & UNITS

SPACE & GEOMETRY

CHANCE & DATA

QUESTIONS MAY REQUIRE STUDENTS TO:

NUMBER

- apply exponent laws involving integer and fractional indices

ALGEBRA

- solve linear inequalities and interpret solutions graphically
- graph transformations of parabolas, hyperbolae, polynomials and circles
- factorise non-monic quadratic expressions
- solve non-monic quadratic equations
- use exponent laws involving products, quotients and powers of variables, and the distributive property

MEASUREMENT

- solve problems involving surface area and volume of composite objects

SPACE

- interpret networks and network diagrams

CHANCE

- solve problems involving conditional probability

ARITHMETIC

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

GEOMETRY

- use trigonometry to solve 3-D problems
- find unknown sides and angles using sine and cosine rules
- apply deductive reasoning to proofs involving shapes in the plane

DATA

- compare data distributions for continuous numerical variables using appropriate data displays including boxplots
- compare distributions in terms of centre, spread, shape and outliers in the context of the data
- use scatter plots to investigate and comment on relationships between two numerical variables