Mathematics Assessment Framework

ICAS International Competitions and Assessments for Schools

UNSW Global THE UNIVERSITY OF NEW SOUTH WALES SYDNEY • AUSTRALIA

Paper A (Year 3) (Calculators are not permitted)

Number and Arithmetic	Algebra and Patterns	Measures and Units	Space and Geometry	Chance and Data
Number: • Counting objects • Ordering and comparing positive whole numbers • Using place Value • Ordering and comparing quarters, halves, tenths and hundredths • Odd and Even Numbers • Using factors and multiples of whole numbers (without using the words "factor" or "multiple")	**Patterns:** • Simple number patterns	**Measures:** • Measure and compare masses, lengths, areas, volumes (and capacities) • Measure and compare time in days, months and years • Recognise half and quarter turns • Identify angles of the same size • Order angles	**Space:** • Identify relative position on a picture or map • Identify figures with reflection symmetry • Identify nets, plans and elevations of 3D figures and vice versa • Identify and continue a pattern of shapes • Reflect a shape about a given axis (simple) • Rotate a shape about a vertex of the shape or its centre	**Chance:** • Simple estimates of probability in words • Order events on rough likelihoods • Find possible arrangements of sets of objects and events
Arithmetic: • The four operations (+, –, ×, ÷) with positive whole numbers	**Pre-algebra:** • Solve simple number puzzles expressed using words or symbols	**Units:** • Select appropriate metric unit to measure a quantity (mL, L, cm, m, km etc)	**Shape:** • Names of basic shapes and their basic features • Identify by looking at shapes or solids which are the same or similar (the terms "congruence", "similarity" not needed) • Names of basic solids and their basic features	**Data:** • Complete a basic table • Read a column graph (bar chart) • Read a basic table • Read a two way table • Read a picture graph (pictogram) • Read a range of common graphs and charts (eg line, tally etc)
	Algebra: • Not tested at this level	**Measurement:** • Read scales of integer intervals • Read analog and digital clocks • Make sensible estimate of number visually • Calculate perimeters of polygons, given all lengths of sides	**Geometry:** • Not tested at this level	

Paper B (Year 4) (Calculators are not permitted)

Number and Arithmetic	Algebra and Patterns	Measures and Units	Space and Geometry	Chance and Data
Number: • Counting objects • Ordering and comparing positive whole numbers • Using place Value • Ordering and comparing quarters, halves, tenths and hundredths • Odd and Even Numbers • Using factors and multiples of whole numbers (without using the words "factor" or "multiple")	**Patterns:** • Simple number patterns	**Measures:** • Measure and compare masses, lengths, areas, volumes (and capacities) • Measure and compare time in days, months and years • Recognise half and quarter turns • Identify angles of the same size • Order angles	**Space:** • Identify relative position on a picture or map • Identify figures with reflection symmetry • Identify nets, plans and elevations of 3D figures and vice versa • Identify and continue a pattern of shapes • Reflect a shape about a given axis (simple) • Rotate a shape about a vertex of the shape or its centre	**Chance:** • Simple estimates of probability in words • Order events on rough likelihoods • Find possible arrangements of sets of objects and events
	Pre-algebra: • Solve simple number puzzles expressed using words or symbols	**Units:** • Select appropriate metric unit to measure a quantity (mL, L, cm, m, km etc)	**Shape:** • Names of basic shapes and their basic features • Identify by looking at shapes or solids which are the same or similar (the terms "congruence", "similarity" not needed) • Names of basic solids and their basic features	
Arithmetic: • The four operations (+, –, ×, ÷) with positive whole numbers	**Algebra:** • Not tested at this level	**Measurement:** • Read scales of integer intervals • Read analog and digital clocks • Make sensible estimate of number visually • Calculate perimeters of polygons, given all lengths of sides • Read scales that have integer intervals with gaps • Use time measurement, be familiar with its unusual features (time is not measured in simple decimal units)	**Geometry:** • Not tested at this level	**Data:** • Complete a basic table • Read a column graph (bar chart) • Read a basic table • Read a two way table • Read a picture graph (pictogram) • Read a range of common graphs and charts (eg line, tally etc)

Paper C (Year 5) (Calculators are not permitted)

Number and Arithmetic	Algebra and Patterns	Measures and Units	Space and Geometry	Chance and Data
Number: • Ordering and comparing positive whole numbers • Using place Value • Ordering and comparing quarters, halves, tenths and hundredths • Odd and Even Numbers • Using factors and multiples of whole numbers (without using the words "factor" or "multiple") • Ordering and comparing decimals • Using prime numbers • Rounding to nearest whole number	**Patterns:** • Simple number patterns	**Measures:** • Measure and compare masses, lengths, areas, volumes (and capacities) • Measure and compare time in days, months and years • Recognise half and quarter turns	**Space:** • Identify relative position on a picture or map • Identify figures with reflection symmetry • Identify nets, plans and elevations of 3D figures and vice versa • Identify and continue a pattern of shapes • Reflect a shape about a given axis (simple) • Rotate a shape about a vertex of the shape or its centre	**Chance:** • Simple estimates of probability in words • Order events on rough likelihoods • Find possible arrangements of sets of objects and events
Arithmetic: • The four operations (+, –, ×, ÷) with positive whole numbers • The four operations (+, –, ×, ÷) with decimals	**Pre-algebra:** • Solve simple number puzzles expressed using words or symbols • Solve complex number puzzle expressed in words	**Units:** • Select appropriate metric unit to measure a quantity (mL, L, cm, m, km etc) • Choose appropriate order of magnitude of mass, length, area, volume (capacity) or time	**Shape:** • Names of basic shapes and their basic features • Identify by looking at shapes or solids which are the same or similar (the terms "congruence", "similarity" not needed) • Names of basic solids and their basic features	**Data:** • Complete a basic table • Read a column graph (bar chart) • Read a basic table • Read a two way table • Read a picture graph (pictogram) • Read a range of common graphs and charts (eg line, tally etc)
	Algebra: • Not tested at this level	**Measurement:** As with Year 4 and also: • Read scales of decimal intervals with gaps • Read scales of decimal intervals • Estimate areas using a grid	**Geometry:** • Not tested at this level	

Paper D (Year 6) (Calculators are not permitted)

Number and Arithmetic	Algebra and Patterns	Measures and Units	Space and Geometry	Chance and Data
Number: • Ordering and comparing positive whole numbers • Using place Value • Ordering and comparing quarters, halves, tenths and hundredths • Odd and Even Numbers • Using factors and multiples of whole numbers (without using the words "factor" or "multiple") • Ordering and comparing decimals • Using prime numbers • Rounding to nearest whole number • Ordering and comparing fractions	**Patterns:** • Simple number patterns • Common number patterns such as square numbers • Choose correct description in words of a number pattern	**Measures:** • Measure and compare masses, lengths, areas, volumes (and capacities) • Measure and compare time in days, months and years • Recognise half and quarter turns	**Space:** • Identify relative position on a picture or map • Identify figures with reflection symmetry • Identify nets, plans and elevations of 3D figures and vice versa • Identify and continue a pattern of shapes • Reflect a shape about a given axis (simple) • Rotate a shape about a vertex of the shape or its centre	**Chance:** • Simple estimates of probability in words • Order events on rough likelihoods • Find possible arrangements of sets of objects and events
Arithmetic: • The four operations (+, –, ×, ÷) with positive whole numbers • The four operations (+, –, ×, ÷) with decimals • Squaring numbers	**Pre-algebra:** • Solve simple number puzzles expressed using words or symbols • Solve complex number puzzle expressed in words	**Units:** • Select appropriate metric unit to measure a quantity (mL, L, cm, m, km etc) • Choose appropriate order of magnitude of mass, length, area, volume (capacity) or time • Convert between standard decimal units	**Shape:** • Names of basic shapes and their basic features • Identify by looking at shapes or solids which are the same or similar (the terms "congruence", "similarity" not needed) • Names of basic solids and their basic features	**Data:** • Complete a basic table • Read a column graph (bar chart) • Read a basic table • Read a two way table • Read a picture graph (pictogram) • Read a range of common graphs and charts (eg line, tally etc)
	Algebra: • Not tested at this level	**Measurement:** As with Year 5	**Geometry:** • Not tested at this level	

Paper E (Year 7) (Calculators are not permitted)

Number and Arithmetic	Algebra and Patterns	Measures and Units	Space and Geometry	Chance and Data
Number: • Ordering and comparing positive whole numbers • Using place Value • Ordering and comparing quarters, halves, tenths and hundredths • Odd and Even Numbers • Using factors and multiples of whole numbers • Ordering and comparing decimals • Using prime numbers • Rounding to nearest whole number • Ordering and comparing fractions • Ordering and comparing all integers including negatives • Rounding to given decimal places	**Patterns:** • Simple number patterns • Common number patterns such as square numbers • Choose correct description in words of a number pattern	**Measures:** • Measure and compare masses, lengths, areas, volumes (and capacities) • Measure and compare time in days, months and years • Recognise half and quarter turns	As with Year 6 and also: • Identify co-ordinates in first quad • Identify and continue patterns based on transformations such as tessellations • Combine simple reflections, rotations, translations & enlargements of simple shapes • Identify a sequence of transformations that have occurred to a shape	**Chance:** • Simple estimates of probability in words • Order events on rough likelihoods • Find possible arrangements of sets of objects and events • Find numerical probabilities based on equally likely outcomes • Find numerical probabilities based on relative frequencies
	Pre-algebra: • Solve simple number puzzles expressed using words or symbols • Solve complex number puzzle expressed in words	**Units:** • Select appropriate metric unit to measure a quantity (mL, L, cm, m, km etc) • Choose appropriate order of magnitude of mass, length, area, volume (capacity) or time • Convert between standard decimal units	**Shape:** • Names of basic shapes and their basic features • Identify by looking at shapes or solids which are the same or similar (the terms "congruence", "similarity" not needed) • Names of basic solids and their basic features	**Data:** As with Year 6 and also: • Complete a two way table • Interpret a range of common graphs, charts and statistical diagrams • Interpret pie charts • Identify correctly drawn pie charts • Find modes from simple categorical data • Obtain likelihoods from data • Find medians • Find means • Make estimates of future or unknown values from data sets
Arithmetic: • The four operations (+, –, ×, ÷) with positive whole numbers • The four operations with decimals • Squaring numbers • The four operations with percentages • The four operations with negatives • Converting between fractions, decimals and percentages	**Algebra:** • Not tested at this level	**Measurement:** As with Year 6 and also: • Calculate areas of rectangles • Calculate areas of shapes based on rectangles	**Geometry:** • Calculate internal angles of a triangle • Calculate internal angles of a quadrilateral • Calculate angle sums based on 90, 180 and 360 degrees	

Paper F (Year 8) (Calculators are permitted)

Number and Arithmetic	Algebra and Patterns	Measures and Units	Space and Geometry	Chance and Data
Number: • Using factors and multiples of whole numbers • Ordering and comparing all integers including negatives • Ordering and comparing decimals • Ordering and comparing fractions • Using prime numbers • Rounding to nearest whole number • Rounding to given decimal places	**Patterns:** • Common number patterns such as square numbers • Completing number patterns where the rule is not given • Choose correct description in words of a number pattern • Identify an expression for a number pattern (linear) • Complete a number pattern (linear) rule given in words	**Measures:** As with Year 7	**Space:** As with Year 7 and also: • Use simple bearings • Plot and identify co-ordinates in all 4 quadrants	**Chance:** • Simple estimates of probability in words • Order events on rough likelihoods • Find possible arrangements of sets of objects and events • Find numerical probabilities based on equally likely outcomes • Find numerical probabilities based on relative frequencies
	Algebra: • Solve complex number puzzle expressed in words • Solve a linear equation with one unknown • Given a variety of constraints on x choose a possible value • Collect terms in an expression • Choose a correct expression of a relation given in words • Change the subject of a formula • Substitute values into an expression • Identify plots of values of a function on a graph • Identify an algebraic formula (linear) derived from a situation	**Units:** As with Year 7	**Shape:** As with Year 7 and also: • Symmetry problems using solids	**Data:** As with Year 7
Arithmetic: • Squaring numbers • The four operations with percentages • The four operations with decimals • the four operations with negatives • Converting between fractions, decimals and percentages • Four operations with fractions • Square roots • Indices and powers • Proportions stated using combinations of fractions, decimals, percentages, ratios		**Measurement:** As with Year 7 and also: • Estimate angles ±20 degrees or less • Calculate perimeters of rectangles or shapes based on rectangles (not all lengths given) • Calculate circumferences and areas of circles • Calculate volumes of shapes based on rectangular prisms • Find surface areas of prisms	**Geometry:** • Calculate internal angles of a triangle • Calculate internal angles of a quadrilateral • Calculate angle sums based on 90, 180 and 360 degrees • Identify angle categories: acute, obtuse and reflex • Solve simple angle problems with line crossing 2 parallel lines	

Paper G & H (Year 9 and 10) (Calculators are permitted)

Number and Arithmetic	Algebra and Patterns	Measures and Units	Space and Geometry	Chance and Data
Number: • Using factors and multiples of whole numbers • Ordering and comparing all integers including negatives • Ordering and comparing decimals • Ordering and comparing fractions • Using prime numbers • Rounding to nearest whole number • Rounding to given decimal places • Rounding to given significant figures	**Patterns:** • Common number patterns such as square numbers • Completing number patterns where the rule is not given • Choose correct description in words of a number pattern • Identify an expression for a number pattern (linear) • Complete a number pattern (linear) rule given in words	**Measures:** As with Year 8	**Space:** As with Year 8 and also: • Solve bearing problems • Use co-ordinates to transform more complex shapes & identify final coordinates	**Chance:** • Simple estimates of probability in words • Order events on rough likelihoods • Find possible arrangements of sets of objects and events • Find numerical probabilities based on equally likely outcomes • Find numerical probabilities based on relative frequencies
	Algebra: As with Year 8 and also: • Given a simple inequalitiy choose a possible value for x • Solve simultaneous equation with two unknowns • Identify a linear graph from function with marked axes • Solve simultaneous linear equation from graph • Identify sketch of linear graph from function without marked axes	**Units:** As with Year 8	**Shape:** As with Year 8	**Data:** As with Year 8 and also: • Calculate range • Use (and choose) averages to compare sets of simple data
Arithmetic: • Squaring numbers • The four operations with percentages • The four operations with decimals • The four operations with negatives • Converting between fractions, decimals and percentages • The four operations with fractions • Square roots • Indices and powers • Proportions stated using combinations of fractions, decimals, percentages, ratios • Operations with scientific notation (standard form)		**Measurement:** As with Year 8 and also: • Calculate areas and perimeters of polygons • Calculate parts of circumferences and areas of circles • Calculate areas and perimeters of triangles • Use congruence or similarity to calculate measures • Find volumes of prisms and cylinders • Find missing lengths of right angled triangles using Pythagoras	**Geometry:** • Calculate internal angles of a triangle • Calculate internal angles of a quadrilateral • Calculate angle sums based on 90, 180 and 360 degrees • Identify angle categories: acute, obtuse and reflex • Solve simple angle problems with line crossing 2 parallel lines • Solve angle problems with polygons (not triangles or rectangles)	

Paper I & J (Year 11 and 12) (Calculators are permitted)

Number and Arithmetic	Algebra and Patterns	Measures and Units	Space and Geometry	Chance and Data
Number: • Using factors and multiples of whole numbers • Ordering and comparing all integers including negatives • Ordering and comparing decimals • Ordering and comparing fractions • Using prime numbers • Rounding to the nearest whole number • Rounding to given decimal places • Rounding to given significant figures	**Patterns:** • Common number patterns such as square numbers • Completing number patterns where the rule is not given • Choose correct description in words of a number pattern • Identify an expression for a number pattern • Complete a number pattern rule given in words	**Measures:** As with Year 9	**Space:** As with Year 9	**Chance:** As with Year 9 and also: • Find probabilities of independent compound events • Find probabilities of dependent compound events • Listing possible outcomes of simple compound events
	Algebra: As with Year 9 and also: • Complex inequality problems • Solve a quadratic equation with one unknown • Solve an inequality (linear) giving a simple range for x • Identify plots of values of a function (quadratic) • Identify the graph of a given quadratic function with marked axes • Identify the graph of a quadratic function as a graph without marked axes • Identify an algebraic formula (quadratic) derived from a context	**Units:** As with Year 9	**Shape:** As with Year 9	**Data:** As with Year 9 and also: • Group continuous data • Find estimates of median and or mean for grouped data • Find modal class of group data • Use averages and ranges to compare sets of data • Identify relationships from scatter graph • Extrapolate and interpolate from graphical data (technical terms not needed)
Arithmetic: • Squaring numbers • The four operations with percentages • The four operations with decimals • The four operations with negatives • Converting between fractions, decimals and percentages • The four operations with fractions • Square roots • Indices and powers • Proportions stated using combinations of fractions, decimals, percentages and ratios • Operations with scientific notation (standard form)		**Measurement:** As with Year 8 and also: • Calculate areas and perimeters of polygons • Calculate parts of circumferences and areas of circles • Calculate areas and perimeters of triangles • Use congruence or similarity to calculate measures • Find volumes of prisms and cylinders • Find missing lengths of right angled triangles using Pythagoras	**Geometry:** • Calculate internal angles of a triangle • Calculate internal angles of a quadrilateral • Calculate angle sums based on 90, 180 and 360 degrees • Identify angle categories: acute, obtuse and reflex • Solve simple angle problems with line crossing 2 parallel lines • Solve angle problems with polygons (not triangles or rectangles)	

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