

CONTENTS

Forward	iii
How to use Maths Mate Skill Builders	iv
Letter to Parents (sample)	vi
Skill Builders	1
Glossary	381
Maths Facts	447
<ul style="list-style-type: none"> Symbols Number Facts Algebra Facts Measurement Facts Trigonometry Facts Geometry Facts 	
Answers	457

MM	SB	[Maths Mate - Mathematical strand]	
Question	Skill No.	Skill Builder - Skill description	
1.		[Long \times, \div]	1
	1.1	Multiplying a large number by a multiple of 10.	
	1.2	Multiplying a large number by a two-digit number.	
	1.3	Multiplying a large number by a large multiple of 10.	
	1.4	Dividing a large number by a single digit.	
	1.5	Dividing a large number by a power of 10.	
	1.6	Dividing a large number by a multiple of 10.	
	1.7	Dividing a whole number by a two-digit number.	
	1.8	Dividing whole numbers - remainder.	
	1.9	Dividing whole numbers - recurring remainder.	
2.		[Decimal $+, -$]	13
	2.1	Adding decimal numbers.	
	2.2	Subtracting decimal numbers.	
	2.3	Subtracting a decimal number from a whole number.	
	2.4	Adding and subtracting decimal numbers.	
3.		[Decimal \times, \div]	21
	3.1	Multiplying a decimal number by a whole number.	
	3.2	Multiplying a decimal number by powers and multiples of 10.	
	3.3	Multiplying a decimal number by a negative power of 10 (e.g. 0.1)	
	3.4	Multiplying a decimal number by a decimal number.	
	3.5	Dividing a decimal number by a whole number.	
	3.6	Dividing a decimal number by a power of 10.	
	3.7	Dividing a decimal number by a negative power of 10 (e.g. 0.1)	
	3.8	Dividing a decimal number by a decimal number.	
	3.9	Dividing a whole number by a decimal number.	

4.	[Fraction +,–]	31
4.1	Adding fractions with the same denominator.	
4.2	Subtracting fractions with the same denominator.	
4.3	Adding mixed numbers with the same denominator.	
4.4	Subtracting mixed numbers with the same denominator.	
4.5	Subtracting a mixed number from a whole number.	
4.6	Adding fractions with different denominators - one denominator divides evenly into the other denominator.	
4.7	Adding fractions with different denominators - the HCF of the denominators is 1 (e.g. 2 and 3, 5 and 6).	
4.8	Adding fractions with different denominators - the denominators have common factors $\neq 1$.	
4.9	Subtracting fractions with different denominators - one denominator divides evenly into the other denominator.	
4.10	Subtracting fractions with different denominators - the HCF of the denominators is 1 (e.g. 2 and 3, 5 and 6).	
4.11	Subtracting fractions with different denominators - the denominators have common factors $\neq 1$.	
4.12	Adding and subtracting fractions with different denominators.	
4.13	Adding or subtracting mixed numbers with different denominators.	
5.	[Fraction \times, \div]	49
5.1	Multiplying a fraction by a whole number.	
5.2	Multiplying two fractions.	
5.3	Multiplying a mixed number by a fraction or by another mixed number.	
5.4	Multiplying three fractions.	
5.5	Dividing two fractions.	
5.6	Dividing a whole number by a fraction.	
5.7	Dividing a fraction by a whole number.	
5.8	Dividing a mixed number by a fraction or by another mixed number.	
6.	[Percentages]	59
6.1	Estimating a percentage.	
6.2	Finding the remaining percentage.	
6.3	Finding a percentage of a multiple of 100.	
6.4	Finding a percentage of any number.	
6.5	Finding a percentage of a quantity.	
6.6	Finding a percentage of a quantity involving unit conversion.	
6.7	Working with more than 100%.	
6.8	Finding a number knowing a percentage of that number.	
6.9	Increasing an amount by a percentage.	
6.10	Decreasing an amount by a percentage.	
6.11	Finding a percentage change.	
7.	[Decimals / Fractions / Percentages]	71
7.1	Ordering decimal numbers.	
7.2	Ordering fractions.	
7.3	Finding equivalent fractions.	
7.4	Writing a decimal number as a fraction in its simplest form.	
7.5	Writing a fraction as a terminating decimal.	
7.6	Writing a fraction as a recurring decimal.	
7.7	Writing a percentage as a fraction in its simplest form.	
7.8	Writing a fraction as a percentage.	
7.9	Writing a decimal number as a percentage.	
7.10	Writing a percentage as a decimal number.	
7.11	Converting between decimals, fractions and percentages.	
7.12	Comparing and ordering decimals, fractions and percentages.	
7.13	Finding a fraction of a whole number.	
8.	[Integer +,–]	85
8.1	Adding integers.	
8.2	Subtracting integers.	
8.3	Adding and subtracting integers.	
8.4	Adding and subtracting integers using order of operations.	
8.5	Finding missing integers using addition and subtraction.	

9.		[Integer \times, \div]	91
	9.1	Multiplying integers.	
	9.2	Dividing integers.	
	9.3	Multiplying integers involving powers of 10.	
	9.4	Multiplying and dividing integers.	
	9.5	Multiplying and dividing integers using order of operations.	
	9.6	Finding missing integers using multiplication and division.	
10.		[Rates / Ratios]	97
	10.1	Simplifying ratios.	
	10.2	Finding the ratio of two or more quantities as a set : set comparison.	
	10.3	Finding the ratio of two quantities as a subset : set comparison.	
	10.4	Deciding if two ratios are in proportion.	
	10.5	Finding the missing term in a proportion.	
	10.6	Solving proportions.	
	10.7	Dividing a quantity into a given ratio.	
	10.8	Working with ratio scales.	
	10.9	Finding the average speed.	
	10.10	Finding the distance travelled.	
	10.11	Finding the time taken to travel a distance.	
	10.12	Finding other rates.	
	10.13	Converting units of speed.	
	10.14	Comparing rates.	
11.		[Indices]	113
	11.1	Evaluating whole numbers in index form.	
	11.2	Evaluating powers with fraction bases.	
	11.3	Multiplying powers with the same base.	
	11.4	Dividing powers with the same base.	
	11.5	Multiplying powers with coefficients and with the same base.	
	11.6	Dividing powers with coefficients and with the same base.	
	11.7	Raising a product to a power.	
	11.8	Raising a power to another power.	
	11.9	Raising a negative number to a power.	
	11.10	Raising a number to a negative power.	
12.		[Square Roots]	123
	12.1	Calculating square roots of perfect squares.	
	12.2	Calculating square roots of perfect squares in fraction form.	
	12.3	Calculating square roots of perfect squares in decimal form.	
	12.4	Calculating multiples of square roots.	
	12.5	Multiplying square roots of perfect squares.	
	12.6	Dividing square roots of perfect squares.	
	12.7	Adding and subtracting square roots of perfect squares.	
	12.8	Estimating square roots.	
13.		[Exploring Number]	131
	13.1	Using 'order of operations' involving a mix of (), \times , \div , + or -	
	13.2	Using 'order of operations' involving powers and (), \times , \div , + or -	
	13.3	Rounding decimal numbers to a given place.	
	13.4	Writing rational approximations of simple irrational numbers.	
	13.5	Writing very large and very small numbers in scientific notation.	
	13.6	Writing a number in scientific notation as a basic numeral.	
	13.7	Using 'order of operations' involving negative numbers.	
	13.8	Recognising whole numbers and integers.	
	13.9	Recognising rational and irrational numbers.	
	13.10	Recognising classes of numbers.	
	13.11	Comparing and ordering rational and irrational numbers.	

14.	[Applied Number]	143
14.1	Estimating outcomes.	
14.2	Minimising expenses - saving.	
14.3	Calculating percentages including commissions, lay-bys, taxes, tips, profit and loss.	
14.4	Calculating wages.	
14.5	Calculating an amount given a percentage of that amount.	
14.6	Increasing or decreasing a quantity by a percentage.	
14.7	Calculating simple interest.	
14.8	Finding a percentage change (percentage profit and discount).	
14.9	Calculating compound growth/interest.	
15.	[Number Patterns]	153
15.1	Completing number patterns in table format by adding, subtracting or multiplying by the same number.	
15.2	Completing number patterns by using changing values in the rule.	
15.3	Completing number patterns by adding or subtracting the same positive number to integers.	
15.4	Completing number patterns by multiplying by the same integer.	
15.5	Completing number patterns by dividing by the same integer.	
15.6	Finding a random term in a number pattern.	
15.7	Finding a particular term of a sequence given its general rule.	
15.8	Finding the general rule of a pattern given a table of values for the pattern.	
15.9	Completing number patterns involving decimals and fractions.	
16.	[Expressions]	163
16.1	Writing expressions to represent word problems.	
16.2	Simplifying expressions.	
16.3	Finding like terms.	
16.4	Simplifying expressions by adding and subtracting like terms.	
16.5	Simplifying expressions by multiplying terms.	
16.6	Simplifying expressions by dividing terms.	
17.	[Substitution]	169
17.1	Substituting value 0 into simple expressions.	
17.2	Substituting one value into expressions involving +, -, \times and \div	
17.3	Substituting two values into expressions involving +, -, \times and \div	
17.4	Substituting into rules.	
17.5	Substituting into formulae.	
17.6	Substituting into rules, expressions and formulae with brackets.	
17.7	Substituting negative values into rules and expressions.	
17.8	Substituting into more complex rules and expressions.	
17.9	Substituting into quadratic rules.	
18.	[Expansion]	179
18.1	Expanding brackets in expressions like $2(a + 1)$	
18.2	Expanding brackets in expressions like $a(a + 1)$	
18.3	Expanding brackets in expressions like $2a(b + 1)$	
18.4	Expanding brackets in expressions like $-2a(b + 1)$	
18.5	Expanding and evaluating expressions.	
18.6	Expanding and evaluating more complex expressions.	
18.7	Expanding brackets in expressions like $(a + 1)(a + 2)$	
18.8	Expanding brackets in binomial squares like $(a + b)^2$	
18.9	Expanding brackets in binomialsquares like $(a - b)^2$	
19.	[Factorisation]	189
19.1	Factorising by finding the HCF of the coefficients.	
19.2	Factorising by finding the HCF of coefficients and pronumerals.	
19.3	Factorising to simplify expressions involving large numbers.	
19.4	Factorising involving squared terms.	
19.5	Factorising negative terms.	
19.6	Factorising by finding binomial factors.	
19.7	Factorising four terms by grouping 2 and 2.	
19.8	Factorising using the difference of perfect squares.	
19.9	Factorising quadratic trinomials.	

20.	[Equations]	199
20.1	Solving one-step equations by using the inverse operations of + and –	
20.2	Solving one-step equations by using the inverse operations of \times and \div	
20.3	Solving two-step equations by using the inverse operations of +, –, \times and \div	
20.4	Solving equations by first expanding the brackets.	
20.5	Solving equations with variables in more than one place.	
20.6	Solving equations involving fractions.	
20.7	Solving inequations.	
20.8	Solving quadratic equations.	
20.9	Solving simultaneous equations.	
20.10	Solving equations by factorising.	
21.	[Graphs & Functions]	219
21.1	Finding the coordinates of a point on a Cartesian plane.	
21.2	Plotting points on a Cartesian plane.	
21.3	Completing a table of values for a linear rule or function.	
21.4	Plotting linear graphs on a Cartesian plane of the type $x = \text{constant}$ and $y = \text{constant}$ (e.g. $x = 1$, $y = 2$).	
21.5	Plotting linear graphs on a Cartesian plane of the type $y = mx + c$ (e.g. $y = 3x + 2$).	
21.6	Completing the missing coordinate of a point on a given line.	
21.7	Deciding if a point is on a line of a given rule.	
21.8	Finding the x-intercept and the y-intercept of a linear graph.	
21.9	Sketching a linear graph by finding the x-intercept and the y-intercept.	
21.10	Finding the gradient of a linear graph.	
21.11	Rewriting a linear function in the general form $y = mx + c$, where m is the gradient and c is the y-intercept of the graph.	
21.12	Finding the gradient, the x-intercept and the y-intercept of a linear function written in the general form $y = mx + c$.	
21.13	Solving simultaneous linear equations by sketching the graphs of both equations on a Cartesian plane.	
21.14	Finding the gradient of a linear graph when two points are given.	
21.15	Writing the equation of a straight line when two points are given.	
21.16	Completing a table of values for a non-linear function.	
22.	[Units of Measurement / Time]	243
22.1	Reading scales.	
22.2	Choosing appropriate units and measurements.	
22.3	Working with measurement prefixes.	
22.4	Measuring with precision and tolerating error.	
22.5	Calculating elapsed time and reading timetables.	
22.6	Converting units of measurement for length.	
22.7	Converting units of measurement for mass.	
22.8	Converting units of measurement for capacity and volume.	
22.9	Converting units of measurement for area.	
22.10	Converting units of measurement between volume and capacity.	
23.	[Perimeter / Area]	253
23.1	Calculating the perimeter of polygons.	
23.2	Calculating the perimeter of composite shapes.	
23.3	Calculating the circumference of circles.	
23.4	Calculating the perimeter of composite circular shapes.	
23.5	Calculating the area of squares and rectangles.	
23.6	Calculating the area of triangles.	
23.7	Calculating the area of parallelograms.	
23.8	Calculating the area of rhombi and kites.	
23.9	Calculating the area of trapeziums.	
23.10	Calculating the area of composite shapes.	
23.11	Calculating the area of circles.	
23.12	Calculating the area of composite circular shapes.	

24.	[Surface Area / Volume]	271
24.1	Calculating the total surface area (TSA) of rectangular prisms and cubes using nets.	
24.2	Calculating the total surface area (TSA) of rectangular prisms.	
24.3	Calculating the total surface area (TSA) of rectangular composite solids.	
24.4	Calculating the total surface area (TSA) of triangular prisms.	
24.5	Calculating the total surface area (TSA) of regular square pyramids.	
24.6	Calculating the total surface area (TSA) of composite real-life composite solids (rectangular and triangular prisms).	
24.7	Calculating the total surface area (TSA) of composite solids (prisms and pyramids).	
24.8	Calculating the total surface area (TSA) of basic 3-dimensional round solids.	
24.9	Calculating the total surface area (TSA) of more complex 3-dimensional round solids.	
24.10	Expressing the total surface area (TSA) of 3-dimensional solids in algebraic form.	
24.11	Calculating the volume of square and rectangular prisms.	
24.12	Calculating the volume of other prisms.	
24.13	Calculating the volume of pyramids.	
24.14	Calculating the volume of basic 3-dimensional round solids.	
24.15	Calculating volume in relation to capacity.	
24.16	Calculating volume in relation to length and area.	
24.17	Calculating the volume of composite solids.	
25.	[Pythagoras / Trigonometry]	293
25.1	Solving simple quadratic equations.	
25.2	Recognising Pythagoras' theorem.	
25.3	Solving more complex quadratic equations.	
25.4	Finding the hypotenuse when the other sides of a right-angled triangle are given.	
25.5	Finding a perpendicular side when the other perpendicular side and the hypotenuse of a right-angled triangle are given.	
25.6	Applying Pythagoras' theorem.	
25.7	Applying Pythagoras' theorem to find the perimeter of two-dimensional shapes.	
25.8	Applying Pythagoras' theorem in a variety of two-dimensional shapes.	
25.9	Finding a side length in isosceles right-angled triangles.	
25.10	Applying Pythagoras' theorem to find the distance between two points located on a coordinate plane.	
25.11	Applying Pythagoras' theorem to find the area of two-dimensional shapes.	
25.12	Recognising trigonometric functions (sine, cosine, tangent).	
25.13	Calculating the value of basic trigonometric ratios in right-angled triangles.	
25.14	Finding an unknown side of a right-angled triangle when a trigonometric ratio of an angle and another side of the triangle are given.	
25.15	Calculating the value of trigonometric ratios in right-angled triangles by first applying Pythagoras' theorem.	
26.	[Shapes]	313
26.1	Recognising polygons, quadrilaterals and triangles.	
26.2	Classifying triangles.	
26.3	Describing the properties of quadrilaterals.	
26.4	Describing the properties of three-dimensional shapes.	
26.5	Using Euler's formula for polyhedra.	
26.6	Recognising line symmetry in two-dimensional shapes.	
26.7	Recognising nets of three-dimensional shapes.	
26.8	Drawing two-dimensional views of three-dimensional shapes.	
26.9	Recognising the shape of cross sections through three-dimensional shapes.	
26.10	Recognising rotational symmetry in two-dimensional shapes.	
26.11	Finding angle size inside a cube.	
27.	[Angles]	325
27.1	Choosing the correct terms related to angles.	
27.2	Finding the complement and the supplement of a given angle.	
27.3	Working with vertically opposite angles.	
27.4	Working with angles in a triangle.	
27.5	Finding the exterior angle of a triangle.	
27.6	Working with angles in a quadrilateral.	
27.7	Working with pairs of alternate, co-interior and corresponding angles.	
27.8	Finding the value of an angle in a variety of diagrams.	
27.9	Finding the value of an angle in a circle.	

28.		[Exploring Geometry]	235
	28.1	Naming and labelling geometric plane shapes.	
	28.2	Describing location on a map.	
	28.3	Recognising and drawing transformations of 2D shapes on a grid.	
	28.4	Drawing translations, reflections and rotations on a coordinate plane.	
	28.5	Recognising and drawing enlargements and reductions on a grid or in a coordinate plane.	
	28.6	Working with scales on a map.	
	28.7	Recognising congruence in two-dimensional shapes.	
	28.8	Recognising similarity in two-dimensional shapes.	
	28.9	Drawing two-dimensional shapes to scale.	
	28.10	Sketching geometrical figures.	
	28.11	Recognising elements of circle geometry.	
29.		[Statistics]	347
	29.1	Interpreting data in column or bar graphs.	
	29.2	Interpreting data in pie charts.	
	29.3	Calculating the mean of sets of data.	
	29.4	Calculating the median of sets of data.	
	29.5	Calculating the mode and range of sets of data.	
	29.6	Calculating the mean, median and mode of sets of data.	
	29.7	Interpreting data in stack graphs.	
	29.8	Interpreting histograms.	
	29.9	Interpreting data in line graphs.	
	29.10	Interpreting frequency tables.	
	29.11	Interpreting scatter plots.	
	29.12	Interpreting stem-and-leaf plots.	
	29.13	Calculating the upper quartile (UQ), lower quartile (LQ) and interquartile range (IQR) for box-and-whisker plots, frequency tables and stem-and-leaf plots.	
	29.14	Drawing box-and-whisker plots.	
30.		[Probability]	365
	30.1	Describing the probability of an event using probability scales.	
	30.2	Calculating the probability of a simple event.	
	30.3	Recognising the probability of complementary events.	
	30.4	Finding the possible outcomes (sample spaces) of an event by completing tree diagrams.	
	30.5	Calculating the probability of multiple events by using tree diagrams or two-way tables to represent the sample spaces.	
	30.6	Calculating the probability of mutually exclusive events by using the Addition Law of Probability.	
	30.7	Calculating the probability of non-exclusive events.	
	30.8	Finding the number of expected successful events.	
	30.9	Calculating the probability of independent events by using the Multiplication Law of Probability.	
	30.10	Completing a probability tree diagram.	
	30.11	Calculating the probability of an event represented by Venn diagrams.	
	30.12	Calculating the probability of an event represented by two-way tables.	