

Malaysia Chinese Independent Secondary  
Schools

Mathematics Curriculum Standard  
(Junior)

Unified Curriculum Committee of  
Malaysian Independent Chinese Secondary  
School (MICSS) Working Committee

March 2018

I.	Learning Objectives	
II.	Time Allocation	
III.	Contents	
	Junior Middle One Volume 1:	
	Chapter 1 Whole Numbers	
	Chapter 2 Properties of Natural Numbers	
	Chapter 3 Integers	
	Chapter 4 Fractions	
	Chapter 5 Decimals	
	Chapter 6 Lengths, Volumes and Masses	
	Chapter 7 Percentages	
	Junior Middle One Volume 2:	
	Chapter 8 Number Bases	
	Chapter 9 Algebraic Expressions	
	Chapter 10 Linear Equations in One Variable	
	Chapter 11 Ratios and Proportions	
	Chapter 12 Basic Concepts of Geometry	
	Chapter 13 Simultaneous Linear Equations in Two Variables	
	Chapter 14 Rectangular Coordinates in Two Dimensions and Graphs	
	Junior Middle Two Volume 1:	
	Chapter 1 Polynomials	
	Chapter 2 Factorisations	
	Chapter 3 Square Roots and Cube Roots	
	Chapter 4 Triangles	
	Chapter 5 Quadrilaterals and Polygons	
	Chapter 6 Perimeters and Areas	
	Junior Middle Two Volume 2:	
	Chapter 7 Circles and Sectors	
	Chapter 8 Pythagorean Theorem	
	Chapter 9 Set Theory	
	Chapter 10 Applications of Set Theory	
	Chapter 11 Quadratic Equations in One Variable and Quadratic Functions	
	Chapter 12 Fractions	
	Chapter 13 Formulas	

	Chapter 14 Linear Inequalities	
	Junior Middle Three Volume 1:	
	Chapter 1 Variations	
	Chapter 2 Indices and Logarithms	
	Chapter 3 Statistical Tables and Charts	
	Chapter 4 Measures of Central Tendency and Quartiles	
	Chapter 5 Similar Figures	
	Chapter 6 Solid Figures, Surface Areas and Volumes	
	Junior Middle Three Volume 2:	
	Chapter 7 Trigonometric Functions	
	Chapter 8 Circles	
	Chapter 9 Loci and Geometrical Constructions	
	Chapter 10 Geometrical Transformations	

# Mathematics Curriculum Standard (Junior)

## I. Learning Objectives

1. To help students acquire the basic knowledge and skills in numbers, quantities and shapes in order to lay their future research foundation;
2. To develop students' abilities of logical thinking;
3. To cultivate the computational skills and concept of space of students;
4. To cultivate the abilities of students to use mathematical methods to solve quantity problems in daily life;
5. To cultivate the scientific attitudes and creativity of students; and
6. To guide students realise the usefulness of Mathematics in order to increase their level of interest towards Mathematics.

## II. Time Allocations

Each level will have thirty two academic weeks yearly with six periods per week and one period consists of forty minutes.

## III. Contents

### Junior Middle One Volume 1

Chapters	Curriculum Contents	Learning Objectives: Students must be able to
Chapter 1 Whole Numbers	1.1 Concepts of whole numbers and natural numbers Introduce whole numbers (0, 1, 2, ...) and natural numbers (1, 2, ...), number bases (Chinese numerals and Arabic numerals), denary number system 1.2 Four arithmetic operations of whole numbers Addition, subtraction, multiplication and division of whole numbers; combined arithmetic operations, order of operations, removing of brackets 1.3 Three laws of arithmetic operations Introduction to Commutative Law, Associative Law, Distributive Law 1.4 Application problems Application problems of operations of	1. Perform computations involving combined arithmetic operations of whole numbers 2. Solve application problems involving operations of whole numbers

	whole numbers	
Chapter 2 Properties of Natural Numbers	<p>2.1 Odd and even numbers The concepts of odd and even numbers</p> <p>2.2 Factors and multiples The concepts and determinations of factors and multiples, methods to find factors</p> <p>2.3 Divisibility of natural numbers Divisibility of given natural numbers by 2, 3, 4, 5, 8, 9, 11</p> <p>2.4 Prime and composite numbers The concepts and determinations of prime and composite numbers</p> <p>2.5 Prime factors The concepts and methods of finding of prime factors, expression of powers of numbers in index forms, factorisations of natural numbers</p> <p>2.6 Common factors and Highest Common Factor The concept of common factor, methods to find common factors and HCF (Euclidean Algorithm included as supplementary material)</p> <p>2.7 Common multiples and Lowest Common Multiples The concept of common multiples, methods to find LCM</p> <p>2.8 Application problems Solve problems involving HCF and LCM</p>	<p>1. Understand the concepts of odd and even numbers, prime and composite numbers, factors and multiples</p> <p>2. Perform factorisations</p> <p>3. Find HCF, LCM and solve related application problems</p>
Chapter 3 Integers	<p>3.1 Positive and negative integers The concepts of positive and negative integers; position of integers on number lines, comparing the magnitude of integers</p> <p>3.2 Four arithmetic operations of integers Addition, subtraction, multiplication, division and power of integers</p> <p>3.3 Combined operations of integers Combined arithmetic and power operations of integers</p> <p>3.4 Inverses and absolute value The concepts of inverses and absolute value</p> <p>3.5 Patterns of sequences Simple sequences, determination of patterns of sequences and find missing</p>	<p>1. Understand positive and negative integers</p> <p>2. Perform arithmetic operations and powers of integers</p>

	terms	
Chapter 4 Fractions	<p>4.1 Concept and basic properties of fractions Introduction to the concept of fractions, applications, graphical representations; simplifying, expanding, reducing to common denominator of fractions</p> <p>4.2 Comparing of positive fractions Comparing the magnitudes of two fractions</p> <p>4.3 Addition and subtraction of fractions Addition and subtraction of fractions with same or different denominators</p> <p>4.4 Mixed fractions The concept of proper, improper and mixed fractions, conversion between improper and mixed fractions, addition and subtraction of mixed fractions</p> <p>4.5 Multiplication and division of fractions Multiplication and division of fractions.</p> <p>4.6 Combined operations of fractions Combined operations of fractions including operations of negative fractions</p> <p>4.7 Complex fractions The concept and simplification of complex fractions</p> <p>4.8 Application problems Application problems of fractions</p>	<p>1. Understand the concept and classification of fractions, comparing magnitude of fractions</p> <p>2. Perform operations of fractions and solve application problems</p>
Chapter 5 Decimals	<p>5.1 Concept of decimals Decimal point, the concept of decimals, conversions between decimals and fractions, decimal place</p> <p>5.2 Four operations of decimals Addition, subtraction, multiplication and division of decimals; combined operations of decimals</p> <p>5.3 Recurring decimals Convert fractions into recurring decimals</p> <p>5.4 Approximate values The concept of approximate values, use rounding to find approximate values, the concept of significant figures, scientific notations</p> <p>5.5 Application problems Application problems of decimals</p>	<p>1. Understand representations of decimals and perform conversions between decimals and fractions</p> <p>2. Perform four operations of decimals and solve application problems</p> <p>3. Convert fractions into recurring decimals</p> <p>4. Understand significant figures and scientific notations and master methods to find approximate values</p>

<p>Chapter 6 Lengths, Volumes and Masses</p>	<p>6.1 Units of lengths and their conversions Units of lengths in km, m, cm, mm, their conversions and related application problems</p> <p>6.2 Units of masses and their conversions Units of masses in ton, kg, g, mg, their conversions and related application problems</p> <p>6.3 Units of volumes and their conversions Units of volumes in <i>l</i>, <i>ml</i>, their conversions and related application problems</p> <p>6.4 Units of time and their conversions Units of time in day, hour, minute, second, their conversions and related application problems. The concepts of century, year, month, week, day and their related application problems</p>	<ol style="list-style-type: none"> <li>1. Perform conversions of units of lengths and solve related application problems</li> <li>2. Perform conversions of units of masses and solve related application problems</li> <li>3. Perform conversions of units of volumes and solve related application problems</li> <li>4. Perform conversions of units of time and solve related application problems</li> </ol>
<p>Chapter 7 Percentages</p>	<p>7.1 Concept of percentages The concept of percentages and its sign (%); conversions between percentages and fractions, percentages and decimals</p> <p>7.2 Application problems Application problems of percentages – find the percentages of portions occupied, find the total amounts given the percentages of portions, percentages of increasing and decreasing, discounts, percentages of profit and loss, simple interests</p>	<ol style="list-style-type: none"> <li>1. Perform conversions between percentages, decimals and fractions and solve related application problems</li> <li>2. Master the computations of percentages of increasing and decreasing, discounts, profit and loss, simple interests and commissions</li> </ol>

### Junior Middle One Volume 2

<p>Chapter 8 Number Bases</p>	<p>8.1 Binary system The concept of binary system, conversions between decimal numbers and binary numbers</p> <p>8.2 Four arithmetic operations of binary numbers Addition, subtraction, multiplication, division of binary numbers</p> <p>8.3 Octal system The concept of octal system, conversions between octal numbers and binary numbers</p>	<ol style="list-style-type: none"> <li>1. Understand the concept of binary system and master the conversions between decimal numbers and binary numbers</li> <li>2. Perform four operations of binary numbers</li> <li>3. Understand the concept of octal system and master the conversions between octal numbers and binary numbers</li> </ol>
<p>Chapter 9 Algebraic</p>	<p>9.1 Algebraic expressions Express descriptions of words in algebraic</p>	<ol style="list-style-type: none"> <li>1. Understand algebraic expressions and calculate</li> </ol>

Expressions	<p>expressions</p> <p>9.2 Values of algebraic expressions Find the values of algebraic expressions</p> <p>9.3 Operations of algebraic expressions Addition and subtraction of algebraic expressions, multiplication and division of algebraic expressions with and by numbers respectively, mixed operations and simplifications of algebraic operations</p> <p>9.4 Concepts of equality and inequality Master the concept of inequality and its representations</p>	<p>their values</p> <ol style="list-style-type: none"> <li>2. Master the operations of algebraic expressions</li> <li>3. Master the concepts of equality and inequality</li> </ol>
Chapter 10 Linear Equations in One Variable	<p>10.1 Linear equations in one variable and their solving methods Introduction to and solve linear equations in one variable</p> <p>10.2 Application problems Application problems of linear equations in one variable</p>	<ol style="list-style-type: none"> <li>1. Solve linear equations in one variable and application problems</li> </ol>
Chapter 11 Ratios and Proportions	<p>11.1 Concepts of ratios and proportions and their properties The concept of ratios, their properties and applications, simplifying of ratios, concept and simplifying of continued ratios; the concept of proportions, their properties and applications</p> <p>11.2 Direct and inverse proportions Applications of direct and inverse proportions</p> <p>11.3 Proportional distribution Application problems of proportional distribution</p>	<ol style="list-style-type: none"> <li>1. Understand the basic properties of ratios and proportions</li> <li>2. Perform the operations of continued ratios</li> <li>3. Master direct and inverse proportions, proportional distribution and solve application problems</li> </ol>
Chapter 12 Basic Concepts of Geometry	<p>12.1 Plane and solid figures The concepts of solids, surfaces, lines, points, the concepts of plane and solid figures</p> <p>12.2 Line symmetry and point symmetry Definitions and determinations of line symmetry and point symmetry</p> <p>12.3 Angles and its measurements Definition and notations of angles, use protractor to measure the sizes of angles and to draw angles</p>	<ol style="list-style-type: none"> <li>1. Understand acute angle, right angle, obtuse angle, straight angle, reflex angle and full turn</li> <li>2. Calculate complementary angles, supplementary angles, adjacent angles on a straight line and conjugate angles</li> <li>3. Understand line symmetry and point symmetry</li> <li>4. Understand the definitions of</li> </ol>



	<p>12.4 Classifications of angles Definitions of straight angle, full turn, right angle, acute angle, obtuse angle and reflex angle, definitions and computations of complementary angles, supplementary angles and conjugate angles</p> <p>12.5 Angles associated with intersecting lines Definition of intersecting lines, property of equality of vertically opposite angles</p> <p>12.6 Angles associated with transversals Definitions of corresponding angles, alternate angles and interior angles on the same side</p> <p>12.7 Perpendicular lines Definitions and properties of perpendicular lines</p> <p>12.8 Properties and criteria of parallel lines Definition of parallel lines, axioms of parallel, theorems of equal corresponding angles and alternate angles, interior angles on the same side, theorem of complementary of interior angles on the same side and its applications; use corresponding angles, alternate angles or interior angles on the same side to determine the parallelism of two straight lines</p>	<p>intersecting lines, perpendicular lines and parallel lines</p> <p>5. Understand the definitions, applications and the properties of vertically opposite angles, corresponding angles, alternate angles and interior angles on the same side</p> <p>6. Master the criteria of parallelism of straight lines</p>
Chapter 13 Simultaneous Linear Equations in Two Variables	<p>13.1 Simultaneous linear equations in two variables Definitions of linear equations in two variables and simultaneous linear equations in two variables</p> <p>13.2 Substitution method Use substitution method to solve simultaneous linear equations in two variables</p> <p>13.3 Elimination method Use elimination method to solve simultaneous linear equations in two variables</p> <p>13.4 Application problems Application problems on simultaneous linear equations in two variables</p>	<p>1. Solve simultaneous linear equations in two variables and application problems</p>
Chapter 14	14.1 Rectangular coordinates in two	1. Understand rectangular

<p>Rectangular Coordinates in Two Dimensions and Graphs</p>	<p>dimensions Definition of rectangular coordinates in two dimensions, points and coordinates, midpoint formula</p> <p>14.2 Linear equations in one variable and straight lines Plot the graph of linear equations in one variable</p> <p>14.3 Graphs of simultaneous linear equations in two variables Use graph to solve simultaneous linear equations in two variables</p>	<p>coordinates in two dimensions</p> <ol style="list-style-type: none"> <li>Master midpoint formula</li> <li>Plot the graphs of linear equations in one variable and master its properties</li> <li>Master the graphical method of linear equations in one variable</li> </ol>
---	---	--

### Junior Middle Two Volume 1

<p>Chapter 1 Polynomials</p>	<p>1.1 Polynomials The concepts of monomials and polynomials, terms of polynomials, coefficients, constant terms and degrees, arrangements in increasing and decreasing orders</p> <p>1.2 Four arithmetic operations of polynomials Addition, subtraction, multiplication and division of polynomials</p> <p>1.3 Multiplication formulas Difference of two squares formula, square of summation formula</p>	<ol style="list-style-type: none"> <li>Understand terms, coefficients, constant terms and degrees of polynomials</li> <li>Perform four operations of polynomials</li> </ol>
<p>Chapter 2 Factorisations</p>	<p>2.1 Factorisations Methods of factorisation – taking out common factors method, formulas methods (difference of two squares formula, square of summation formula), cross multiplication method, grouping method</p> <p>2.2 Highest common factor and least common multiple Find HCF and LCM</p>	<ol style="list-style-type: none"> <li>Perform factorisations of polynomials</li> <li>Find the HCF and LCM of polynomials</li> </ol>
<p>Chapter 3 Square Roots and Cube Roots</p>	<p>3.1 Square roots and positive square roots and their properties Definitions of square roots and positive square roots, properties and computations of positive square roots</p> <p>3.2 Cube roots Definition and computations of cube roots.</p> <p>3.3 Rational and irrational numbers</p>	<ol style="list-style-type: none"> <li>Perform computations of square roots and cube roots</li> <li>Understand definition of quadratic radical</li> <li>Perform simplifications of quadratic radicals</li> <li>Perform four operations of quadratic radicals</li> </ol>

	<p>The concepts of rational, irrational and real numbers</p> <p>3.4 Simplifications of quadratic radicals Simplifications of quadratic radicals</p> <p>3.5 Four operations of quadratic radicals Addition, subtraction, multiplication and division of quadratic radicals. (rationalizing denominators)</p>	
Chapter 4 Triangles	<p>4.1 Triangles The concepts of triangles – sides, vertices, interior angles, exterior angles, angle bisectors, medians, heights, perpendicular bisectors, sums of any two sides greater than the third sides, long sides facing large angles and vice versa, acute-angle triangles, right-angled triangles, obtuse-angled triangles</p> <p>4.2 Interior angles and exterior angles of triangles Sum of interior angles of triangles equal to <math>180^\circ</math>, sum of any exterior angles of triangles are equal to the sum of their remote interior angles</p> <p>4.3 Congruent triangles Definition of congruent triangles, use SSS, SAS, ASA and AAS axioms to determine congruence of triangles</p> <p>4.4 Isosceles triangles and equilateral triangles Definition and properties of isosceles triangles – equal base angles, angle bisectors of vertex angles are perpendicular to and bisect bases, criteria of isosceles triangles, properties of equilateral triangles – all interior angles are <math>60^\circ</math></p> <p>4.5 Right-angled triangles Definition and properties of right-angled triangles – two acute angles complement to each other, criterion of congruence to right-angled triangles – equal hypotenuses and legs</p>	<ol style="list-style-type: none"> <li>1. Know the classifications of triangles</li> <li>2. Understand the relationships of sides and angles of triangles</li> <li>3. Understand the sum of interior angles and the relationship between exterior angles and interior angles</li> <li>4. Master the criteria and proofs of congruence of triangles.</li> <li>5. Master the properties of isosceles triangles, equilateral triangles and right-angled triangles</li> </ol>
Chapter 5 Quadrilaterals and Polygons	<p>5.1 Quadrilaterals Definition of diagonals, sum of interior angles</p> <p>5.2 Parallelograms</p>	<ol style="list-style-type: none"> <li>1. Master properties and criteria of different quadrilaterals</li> <li>2. Understand the relationships among different</li> </ol>

	<p>Properties of parallelograms – the opposite sides and opposite angles are equal, two diagonals bisect each other, criteria of parallelograms – one pair of opposite sides are parallel and equal, two pairs of opposite sides are equal, two pairs of opposite angles are equal, two diagonals intersect and the intersection point bisects each other</p> <p>5.3 Rectangles Properties of rectangles – the diagonals are equal, one interior angle of a parallelogram is a right angle, parallelograms with equal diagonals</p> <p>5.4 Rhombuses Properties of rhombuses – the diagonals are perpendicular to each other, each diagonal bisects a pair of opposite angles, criteria of rhombuses – parallelograms with the diagonals perpendicular to each other</p> <p>5.5 Squares Properties of squares – the diagonals are equal and perpendicular to each other, each diagonal bisects a pair of opposite angles</p> <p>5.6 Kites Properties of kites – a pair of opposite angles are equal, the diagonals are perpendicular to each other, one diagonal bisects the other diagonal</p> <p>5.7 Trapeziums Definitions of trapeziums, right-angled trapeziums and isosceles trapeziums</p> <p>5.8 Relationships among different quadrilaterals Use sets to express the relationships among different quadrilaterals</p> <p>5.9 Polygons The related concepts of polygons – sides, interior angles, exterior angles, vertices, diagonals, convex polygons, formulas of the sum of interior angles and exterior angles</p>	<p>quadrilaterals</p> <p>3. Calculate the sum of interior angles and exterior angles of polygons</p>
Chapter 6 Perimeters and Areas	<p>6.1 Perimeters Definition and calculations of perimeters</p> <p>6.2 Areas Definition and calculations of areas, squares, rectangles, parallelograms,</p>	<p>1. Calculate the perimeters and areas of squares, rectangles, triangles, parallelograms, trapeziums, rhombuses, kites and other plane figures</p>

	<p>triangles, rhombuses, kites, areas of trapeziums, ratios of areas of triangles with equal heights</p> <p>6.3 Conversions of units</p> <p>Conversions of units of areas</p>	<p>2. Apply the formula of ratio of areas of triangles with equal heights</p>
--	---	---

### Junior Middle Two Volume 2

<p>Chapter 7</p> <p>Circles and Sectors</p>	<p>7.1 Circles</p> <p>Definition, radii, diameters of circles, perimeters and areas of circles</p> <p>7.2 Arc lengths and areas of sectors</p> <p>The formulas of arc lengths and areas of sectors and their applications</p>	<p>1. Calculate the perimeters and areas of circles and sectors</p>
<p>Chapter 8</p> <p>Pythagorean Theorem</p>	<p>8.1 Pythagorean theorem</p> <p>Proofs of Pythagorean theorem and their applications</p> <p>8.2 Converse theorem of Pythagorean theorem</p> <p>Applications of the converse theorem of Pythagorean theorem</p> <p>8.3 Distance formula</p> <p>Distance formula of two points on the rectangular coordinates system</p>	<p>1. Master the Pythagorean theorem and its converse theorem</p> <p>2. Apply the distance formula</p>
<p>Chapter 9</p> <p>Set Theory</p>	<p>9.1 Sets and elements</p> <p>Concepts of sets and elements, determine the elements of sets, representations of sets – tabular form, set builder form, Venn diagram, concepts of empty set and its determination</p> <p>9.2 Finite sets and cardinalities</p> <p>Concepts of finite sets and infinite sets, definition and ways of finding cardinalities</p> <p>9.3 Relationships and operations among sets</p> <p>Definition, determination and number of subsets, definition and determination of equal sets, definition and determination of disjoint sets, definition, properties (Commutative Law, Associative Law) and ways of finding unions of sets, definition, properties (Commutative Law, Associative Law) and ways of finding intersections of sets, the Distributive Law of intersections and unions of sets, definition and ways of finding difference among sets</p>	<p>1. Understand the representations of sets and elements, relationships among sets and elements</p> <p>2. Understand the concepts of empty sets, finite sets and cardinalities</p> <p>3. Understand the definition and representations of subsets.</p> <p>4. Understand the concept of equal sets and disjoint sets.</p> <p>5. Understand the definitions and operations of unions, intersections and difference among sets</p> <p>6. Understand the definition and operations of universal sets and complementary sets</p>

	<p>9.4 Universal sets and complementary sets Definition and representations of universal sets, definition, properties and ways of finding complementary sets</p>	
<p>Chapter 10 Applications of Set Theory</p>	<p>10.1 Cardinality formula of the unions of two sets and its applications Cardinality formula of the unions of two sets and its applications (supplemented by Venn diagrams)</p> <p>10.2 Cardinality formula of complementary sets and its applications Cardinality formula of complementary sets and its applications (supplemented by Venn diagrams)</p> <p>10.3 Cardinality formula of the union of three sets and its applications Cardinality formula of the union of three sets and its applications (supplemented by Venn diagrams)</p>	<ol style="list-style-type: none"> <li>1. Master the cardinality formulas of the unions of two or three sets and their applications</li> <li>2. Master the cardinality formula of complementary sets and its applications</li> <li>3. Solve by using Venn diagrams</li> </ol>
<p>Chapter 11 Quadratic Equations in One Variable and Quadratic Functions</p>	<p>11.1 Solving methods of quadratic equations in one variable Factorization, completing the square, formula</p> <p>11.2 Application problems Solve application problem of quadratic equations in one variable</p> <p>11.3 Graphs of quadratic functions Plot the graphs of quadratic functions, axes of symmetry, vertices</p>	<ol style="list-style-type: none"> <li>1. Solve quadratic equations in one variable and application problems</li> <li>2. Plot the graphs of quadratic functions and master its properties</li> </ol>
<p>Chapter 12 Fractions</p>	<p>12.1 Concepts and properties of fractions Concepts and basic properties of fractions – expanding, simplifying, and reducing to common denominator of fractions</p> <p>12.2 Four operations of fractions Addition, subtraction, multiplication and division of fractions</p> <p>12.3 Complex fractions Simplification of complex fractions.</p> <p>12.4 Fractional equations Solve fractional equations.</p> <p>12.5 Application problems of fractional equations Solve application problems of fractional</p>	<ol style="list-style-type: none"> <li>1. Understand fractional equations and its basic properties</li> <li>2. Perform four operations of fractions</li> <li>3. Solve fractional equations.</li> <li>4. Solve application problems of fractional equations</li> </ol>

	equations	
Chapter 13 Formulas	13.1 Formation of formulas Formation of formulas 13.2 Changes of the subjects of formulas Changes of the subjects of formulas and related application problems	1. Understand the formation of formulas 2. Change the subjects of formulas and solve application problems
Chapter 14 Inequalities	14.1 Basic properties of inequalities Basic properties of inequalities – add or subtract same numbers to both sides, the inequality sign remains the same direction, multiply positive numbers to both sides, the inequality sign remain the same direction, multiply negative numbers to both sides, the inequality sign becomes the opposite direction 14.2 Linear inequalities in one variable Solve linear inequalities in one variable 14.3 System of linear inequalities in one variable Solve system of linear inequalities in one variable 14.4 Application problems Application problems of inequalities	1. Master the basic properties of inequalities 2. Solve linear inequalities in one variable 3. Solve system of linear inequalities in one variable. 4. Solve application problems of inequalities

### Junior Middle Three Volume 1

Chapter 1 Variations	1.1 Direct variations Concept and applications of direct variations 1.2 Inverse variations Concept and applications of inverse variations 1.3 Joint variations Concept and applications of joint variations	1. Solve problems in direct, inverse and joint variations
Chapter 2 Indices and Logarithms	2.1 Powers with zero exponent and powers with negative integer exponents Definition and laws of indices of powers with zero exponent and powers with negative integer exponents 2.2 Powers with fractional exponents Definition and laws of indices of powers with fractional exponents 2.3 Basic exponential equations	1. Understand the definitions of powers with zero exponent, powers with negative integer exponents and powers with fractional exponents 2. Master the laws of indices. 3. Solve basic exponential equations 4. Understand the definition of

	<p>Exponential equations that can be converted into having the same bases</p> <p>2.4 Definition and properties of logarithms Definition of logarithm, common logarithms (logarithms with base 10), properties of logarithms—<math>\log_a a = 1</math>, <math>\log_a 1 = 0</math>, products, divisions and powers of logarithms</p>	<p>logarithm and master the laws of logarithms</p>
<p>Chapter 3 Statistical Tables and Charts</p>	<p>3.1 Basic concepts of statistics Introduction to statistics, population samplings and sample samplings</p> <p>3.2 Statistical tables Frequency distribution tables of ungroup data, grouping of data and construction of frequency distribution tables</p> <p>3.3 Statistical charts Pictographs, bar charts (simple and multiple), pie charts, line graphs, stem and leaf diagrams, histograms and frequency polygons</p> <p>3.4 Cumulative frequency tables and cumulative frequency polygons Construction of cumulative frequency tables and cumulative frequency polygons, solve problems by using cumulative frequency polygons</p>	<ol style="list-style-type: none"> <li>1. Understand statistical table and charts</li> <li>2. Construct pictographs, bar charts, pie charts and line graphs and master their features</li> <li>3. Construct frequency distribution tables and cumulative frequency tables</li> <li>4. Construct histograms and frequency polygons</li> <li>5. Construct cumulative frequency polygons and calculate cumulative frequency percentages</li> </ol>
<p>Chapter 4 Measures of Central Tendency and Quartiles</p>	<p>4.1 Measures of central tendency Find means, medians and modes of ungrouped data, find means of grouped data</p> <p>4.2 Quartiles Find quartiles of ungrouped data, find quartiles of grouped data from cumulative frequency polygons</p>	<ol style="list-style-type: none"> <li>1. Find the means, medians and modes</li> <li>2. Find the quartiles</li> </ol>
<p>Chapter 5 Similar Figures</p>	<p>5.1 Similar figures Concept and criteria of similar figures – all corresponding angles are equal and all ratios of corresponding sides are equal</p> <p>5.2 Criteria and applications of similar figures Criteria of similar triangles – all ratios of corresponding sides are equal, all corresponding angles are equal, all ratios of corresponding sides are equal and corresponding angles lie among the</p>	<ol style="list-style-type: none"> <li>1. Master the properties of similar figures</li> <li>2. Master the criteria and applications of similar figures</li> <li>3. Master the ratios of areas of similar figures</li> </ol>



	<p>corresponding sides are equal, applications of similar triangles – find side lengths and angles</p> <p>5.3 Ratios of areas of similar figures</p> <p>Ratios of areas of similar figures and their applications</p>	
<p>Chapter 6</p> <p>Solid Figures, Surface Areas and Volumes</p>	<p>6.1 Surface areas and volumes and their conversions of units</p> <p>Definitions and calculations of surface areas and volumes, surface areas and volumes of squares and rectangles, conversions of units of surface areas and volumes</p> <p>6.2 Nets</p> <p>Nets of solids</p> <p>6.3 Prisms</p> <p>Definition and properties of prisms, right prisms, definition of regular prisms, volumes of prisms, surface areas and volumes of right prisms</p> <p>6.4 Right circular cylinders</p> <p>Definition, volumes and surface areas of right circular cylinders</p> <p>6.5 Pyramids</p> <p>Definitions of pyramids and regular pyramids, volumes and surface areas of pyramids</p> <p>6.6 Right circular cones</p> <p>Definition, volumes and surface areas of right circular cones</p> <p>6.7 Spheres</p> <p>Definition, volumes and surface areas of spheres</p>	<p>1. Calculate the surface areas and volumes of cubes, cuboids, prisms, pyramids and spheres and other solid figures</p> <p>2. Draw nets of solids</p>

### Junior Middle Three Volume 2

<p>Chapter 7</p> <p>Trigonometric Functions</p>	<p>7.1 Trigonometric functions of acute angles</p> <p>Definitions of sine, cosine and tangent of acute angles</p> <p>7.2 Values of trigonometric functions of special angles</p> <p>Values of sine, cosine and tangent of <math>30^\circ</math>, <math>45^\circ</math> and <math>60^\circ</math></p> <p>7.3 Given the value of a trigonometric function, find the other values of trigonometric functions</p>	<p>1. Understand the definitions of sine, cosine and tangent of acute angles and the pattern of changes</p> <p>2. Master the values of trigonometric functions of special angles (<math>30^\circ</math>, <math>45^\circ</math>, <math>60^\circ</math>)</p> <p>3. Master the applications of trigonometric functions</p>
---	---	---

	<p>Given the value of a trigonometric function, find the other values of trigonometric functions</p> <p>7.4 Applications of trigonometric functions Solve right-angled triangles, application problems. (including those related with angles of elevation and angles of depression)</p>	
Chapter 8 Circles	<p>8.1 Central angles Central angle theorem</p> <p>8.2 Angles at the circumference Angles subtended by the same arc at the circumference are equal, angles subtended by the diameter at the circumference, angles subtended by the same arc at the circumference</p> <p>8.3 Radius that is perpendicular to a chord bisects the chord and bisects the two arcs subtended by the chord Radius that is perpendicular to a chord bisects the chord and bisects the two arcs subtended by the chord</p> <p>8.4 Cyclic quadrilaterals Opposite angles of cyclic quadrilaterals supplementary to each other, the exterior angles of cyclic quadrilaterals are equal to the interior opposite angles</p> <p>8.5 Relationships among straight line and circles Relationships among straight lines and circles – disjoint, tangent to each other, intersect, properties of tangents – perpendicular to the radii that pass through the contact points, two tangents to a circle that pass through a common outer point of the circle are of equal lengths, the line segment with the endpoints being the common outer point and centre of the circle bisects the angles between the two tangents</p> <p>8.6 The angle between a chord and a tangent through one of the end points of the chord. Alternate segment theorem</p>	<p>1. Master central angle theorem, angles subtended by the same arc at the circumference are equal, angles subtended by the diameter at the circumference and the radius that is perpendicular to a chord bisects the chord and bisects the two arcs subtended by the chord</p> <p>2. Master related theorems about cyclic quadrilaterals.</p> <p>3. Master criteria and properties of tangents</p> <p>4. Master the result that states two tangents to a circle that pass through a common outer point of the circle are of equal lengths and alternate segment theorem</p>
Chapter 9	9.1 Loci	1. Understand the concepts of

<p>Loci and Geometrical Constructions</p>	<p>Concepts of loci, find the loci of moving points</p> <p>9.2 Constructions of circles Construct circles with given centres and radii, find centres and radii of given circles</p> <p>9.3 Constructions of perpendicular lines Construct perpendicular bisectors of line segments, construct a straight line passing through a point and perpendicular to a given straight line</p> <p>9.4 Constructions of angles and angle bisectors Construct angles equal to given angles, construct angle bisectors of given angles, construct angles of <math>30^\circ</math>, <math>45^\circ</math>, <math>60^\circ</math> and other special angles</p> <p>9.5 Constructions of triangles Construct triangles with three given side lengths and triangles with two given angles (special angles) and a side</p> <p>9.6 Constructions of parallel lines Construct a straight line passing through a point and parallel to a given straight line.</p> <p>9.7 Constructions of circumcircles and inscribed circles of triangles Construct triangles</p> <p>9.8 Constructions of regular polygons Construct regular hexagons and regular octagons</p>	<p>loci</p> <ol style="list-style-type: none"> <li>2. Construct circles with given centres and radii</li> <li>3. Construct perpendicular bisectors of line segments</li> <li>4. Construct a straight line passing through a point and perpendicular to a given straight line</li> <li>5. Find the centres of given circles</li> <li>6. Construct squares, triangles, parallelograms and regular polygons</li> <li>7. Construct angles equal to given angles and special angles and angle bisectors</li> <li>8. Construct a straight line passing through a point and parallel to a given straight line</li> <li>9. Construct circumcircles and inscribed circles of triangles</li> </ol>
<p>Chapter 10 Geometrical Transformations</p>	<p>10.1 Reflections Definitions and properties of reflections</p> <p>10.2 Translations Definitions and properties of translations, use ordered pairs to express translations, continuous translations</p> <p>10.3 Rotations Definitions and properties of rotations, centres of rotations and angle of rotations</p> <p>10.4 Enlargements Definitions and properties of enlargements, find the images of enlargements, centres of enlargements and factors of enlargements</p>	<ol style="list-style-type: none"> <li>1. Master reflections.</li> <li>2. Master translations and use ordered pairs to express translations</li> <li>3. Master rotations, find centres of rotations and angles of rotations</li> <li>4. Master enlargements, find centres of enlargements and factors of enlargements</li> </ol>