

1. Our Expectations

(a) Number and Algebra Dimension

To develop students an ever-improving capability to

- ◆ extend the concepts of numbers to rational and irrational numbers;
- ◆ develop various strategies in using numbers to formulate and solve problems, and to examine results;
- ◆ develop and refine strategies for estimating;
- ◆ extend the use of algebraic symbols in communicating mathematical ideas;
- ◆ explore and describe patterns of sequences of numbers using algebraic symbols;
- ◆ interpret simple algebraic relations from numerical, symbolic and graphical perspectives;
- ◆ manipulate algebraic expressions and relations; and apply these knowledge and skills to formulate and solve simple practical problems and to examine results;
- ◆ apply the knowledge and skills of the Number and Algebra Dimension to formulate and solve a variety of practical problems in various Learning Dimensions.
- ◆ understand the real number system;
- ◆ investigate and describe relationships between quantities using algebraic symbols and relations;
- ◆ generalize and describe patterns of sequences of numbers using algebraic symbols; and apply the results to solve problems;
- ◆ interpret more complex algebraic relations from numerical, symbolic and graphical perspectives;
- ◆ manipulate more complex algebraic expressions and relations, and apply these knowledge and skills to formulate and solve a variety of practical problems and justify the validity of results; and
- ◆ apply the knowledge and skills in the Number and Algebra Dimension to generalize, describe and communicate mathematical ideas and solve further problems in various Learning Dimensions.

(b) Measures, Shape and Space Dimension

To develop students an ever-improving capability to

- ◆ understand the nature of measurement and be aware of the issues about precision and accuracy;
- ◆ apply a variety of techniques, tools and formulas for measurements and solving mensuration problems;
- ◆ explore and visualize geometric properties of 2-dimensional and 3-dimensional objects intuitively;
- ◆ use inductive reasoning, deductive reasoning and analytic approach to study the properties of 2-dimensional rectilinear shapes;
- ◆ formulate and write simple geometric proofs involving 2-dimensional rectilinear shapes with appropriate symbols, terminology and reasons;
- ◆ inquire, describe and represent geometric knowledge in 2-dimensional figures using

numeric and algebraic relations;

- ◆ inquire geometric knowledge in 2-dimensional space using trigonometric relations; and
- ◆ interconnect the knowledge and skills of the Measures, Shape and Space Dimension and other Learning Dimensions, and apply them to formulate and solve 2-dimensional problems.
- ◆ use and select inductive reasoning, deductive reasoning or analytic approach to study the properties of 2-dimensional shapes;
- ◆ formulate and write geometric proofs involving 2-dimensional shapes with appropriate symbols, terminology and reasons;
- ◆ inquire, describe and represent geometric knowledge in 2-dimensional space using algebraic relations;
- ◆ inquire, describe and represent geometric knowledge in 2-dimensional and 3-dimensional space using trigonometric functions; and
- ◆ interconnect the knowledge and skills of the Measures, Shape and Space Dimension and other Learning Dimensions, and apply them to formulate and solve 2-dimensional and 3-dimensional problems with various strategies.

(c) Data Handling Dimension

To develop students an ever-improving capability to

- ◆ understand the criteria for organizing discrete and continuous statistical data;
- ◆ choose and construct appropriate statistical diagrams and graphs to represent given data and interpret them;
- ◆ find, interpret and select the measure to describe the central tendency of a set of data;
- ◆ judge the appropriateness of the methods used in handling statistical data;
- ◆ understand the notion of probability and handle simple probability problems by listing and drawing diagrams;
- ◆ inquire and solve statistical and probability problems with appropriate strategies.
- ◆ understand and compute the measures of dispersion;
- ◆ select and use the measures of central tendency and dispersion to compare data sets;
- ◆ investigate and judge the validity of arguments derived from the data set;
- ◆ formulate and solve further probability problems by applying simple laws; and
- ◆ integrate the knowledge in statistics and probability to solve real life problems.

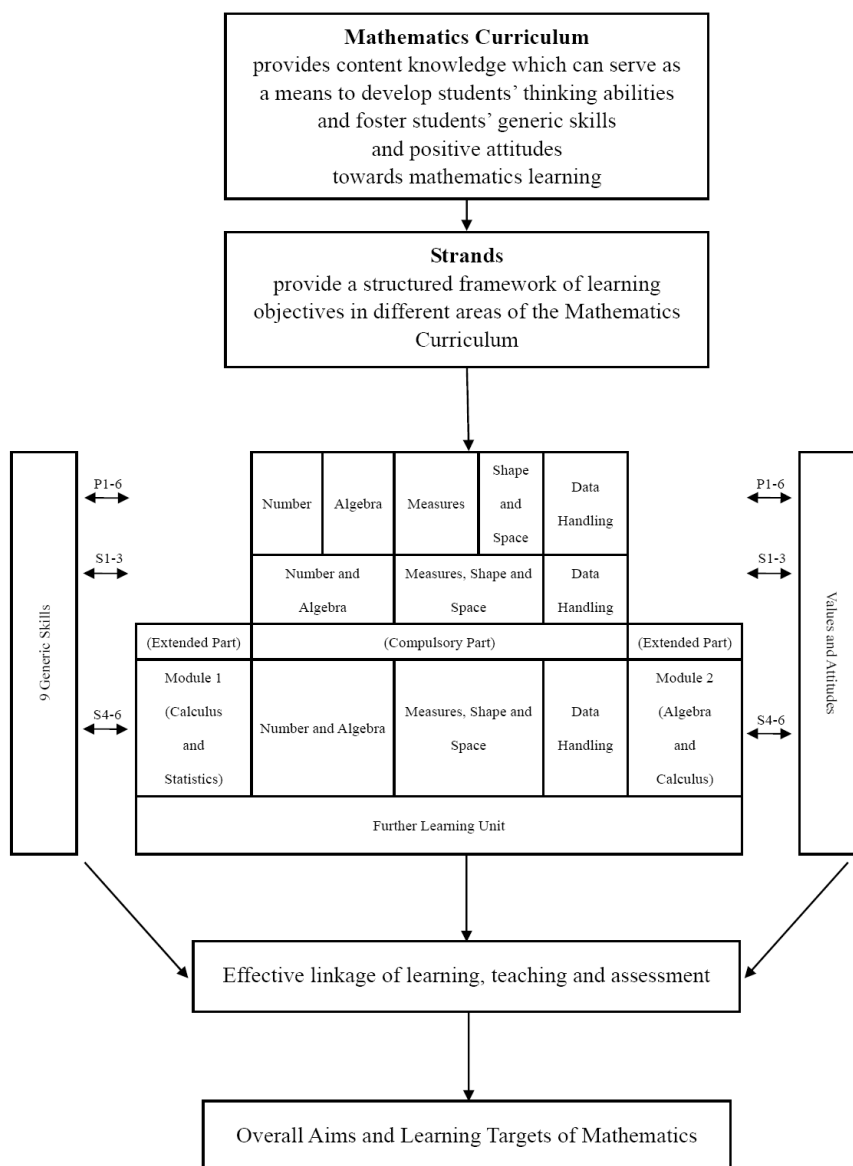
2. Curriculum Framework

The curriculum framework for Mathematics Education is the overall structure for organising learning and teaching activities for the subject of Mathematics. The framework comprises a set of interlocking components, including:

- ◆ subject knowledge and skills, which are expressed in the form of learning targets and learning objectives within strands;
- ◆ generic skills; and
- ◆ positive values and attitudes.

The framework sets out what students should know, value and be able to do at various stages of schooling from Primary 1 to Secondary 6. It provides schools and teachers with the flexibility to adapt the Mathematics Curriculum to meet their varied needs.

Diagrammatic Representation of the Framework of the Mathematics Curriculum



F.1 curriculum framework

- (a) Basic Mathematics
- (b) Directed Numbers and the Number Line
- (c) Introduction to Algebra
- (d) Algebraic Equations in one unknown
- (e) Percentage (I)
- (f) Estimation in Numbers and Measurement
- (g) Introduction to Geometry
- (h) Symmetry and Transformation
- (i) Areas and Volumes (I)
- (j) Congruence and Similarity
- (k) Introduction to Coordinates
- (l) Angles related to Lines
- (m) Manipulation of simple Polynomials
- (n) Introduction to Various Stages of Statistics
- (o) Simple Statistical Diagrams and Graphs (I)**

F.2 curriculum framework

- (a) Rate and Ratio
- (b) Identities and Factorization
- (c) Algebraic Fractions and Formulas
- (d) More about Factorization of Polynomials
- (e) Approximation and Errors
- (f) Angles related to Rectilinear Figures
- (g) Simple Statistical Diagrams and Graphs
- (h) Linear Equations in Two Unknowns
- (i) Laws of Integral Indices
- (j) Introduction to Deductive Geometry
- (k) Rational and Irrational Numbers
- (l) Pythagoras' Theorem
- (m) Area and Volume (II)
- (n) trigonometric Ratios

F.3 curriculum framework

- (a) Factorization of Simple Polynomials
- (b) Laws of Indices
- (c) More about Rational and Irrational Numbers
- (d) Percentage (II)
- (e) Linear Inequalities in One Unknown
- (f) Introduction to Probability
- (g) Measures of Central Tendency
- (h) More on Deductive Geometry
- (i) Quadrilaterals
- (j) More about 3-D Figures
- (k) Area and Volume (III)
- (l) Coordinate Geometry of Straight Lines
- (m) Applications in Trigonometry

F.4 curriculum framework

- (a) Quadratic Equations in One Unknown (I)
- (b) Quadratic Equations in One Unknown (II)

- (c) Functions and Graphs
- (d) Exponential Functions
- (e) Logarithmic Functions
- (f) Equations of Straight Lines
- (g) More about Polynomials (I)
- (h) More about Polynomials (II)
- (i) Simultaneous Equations, One Linear and One Quadratic
- (j) More about Trigonometry
- (k) Applications of Trigonometry in 2-dimensional Problems
- (l) Variations

F.5 curriculum framework

- (a) More about Quadratic Equations
- (b) Basic Properties of Circles
- (c) Tangent to Circles
- (d) Locus
- (e) Equations of Circles
- (f) Inequalities
- (g) Linear programming
- (h) More about Graphs of Functions
- (i) Permutation and Combination
- (j) More about Probability

F.6 curriculum framework

- (a) Arithmetic and Geometric Sequence
- (b) Summation of Arithmetic and Geometric Sequences
- (c) Application of Trigonometry in 3-dimensional Problems
- (d) Measures of Dispersion
- (e) Uses and Abuses of Statistics

3. Language Policy

Our school adopts English as the medium of instruction in teaching and learning. Summer Bridging Programme is offered to newly admitted F.1 students to help them adapt to the English learning environment.

Typical Characteristics of the English Language Learner

- Listening as opposed to speaking (Silent Period), uses yes/no responses
- Responds in native language or nonverbally (points, nods)
- May display avoidance behavior or affective filter may be high
- Uses mostly concrete words and phrases from a limited bank of high-frequency, high-need words or uses short phrases with slow speech
- Copies, labels, displays limited writing skills in the target language
- Finds mathematics text to be incomprehensible except for numerals and a few cognate words associated with the student's prior academic experience
- Solves math problems using a different or alternate approach
- May find math symbols confusing (i.e., placement of commas and decimals)
- May have social English language ability but academic language is very limited

Some Suggested Strategies

- Use a lot of gestures and encourage—but do not force—students to speak.
- Build student confidence by scaffolding questions and by providing positive feedback and opportunities for success.
- Use different methods of eliciting student responses (verbal/non-verbal), such as red/green card. Ask students to label, list, or draw when appropriate.
- Focus on conveying meanings and on academic content vocabulary development using multiple teaching modalities such as pictures, graphs, charts, graphic organizers, number lines, word walls, TI interactive, TI connect, and math manipulatives.
- Explicitly introduce new vocabulary while considering multiple learning styles.
- Maintain appropriate rate of speech and wait time (exhibiting awareness of the processing time needed for students to mentally translate).
- Model appropriate grammar and usage but use simple syntax (noun, verb, object).
- Model appropriate language, but do not overtly call attention to grammatical errors in writing or speech. Avoid the use of slang or idioms.
- Model thinking strategies and study skills aloud for students.
- Provide purposeful group activities that encourage oral language.
- Use native language cognates as appropriate.
- Model the math processes used as well as the writing and labeling involved.
- Use the K-W-L strategy (listing what students Know, Want to know, and have Learned) regarding a specific topic or concept.
- Pair the ELL with a peer who is proficient in both languages.
- Help students develop a personal math vocabulary list, glossary, or flip book.
- Preview and review important concepts, using highlighters to color code items.
- Use the Frayer model—examples vs. non-examples of a concept.
- Be cognizant of confusing word meanings and explain the different use of certain words, such as “table” or “base.”
- Provide many opportunities to write in first language as well as in English.

4. Learning Outcomes

(a) Number and Algebra Dimension

- ◆ understand and accept intuitively the concept and uses of negative numbers
- ◆ have simple ideas of ordering on the number line
- ◆ explore and discuss the manipulation of directed numbers
- ◆ manipulate directed numbers
- ◆ be aware of the need to use estimation strategies in real-life situations and appreciate the past attempts to approximate values such as π
- ◆ determine whether to estimate values or to compute the exact values
- ◆ select and use estimation strategies to estimate values and to judge the reasonableness of results
- ◆ choose appropriate means for calculation such as mental computation, calculators or paper and pencil etc.
- ◆ acquire further concepts and skills of rounding off numbers to a required number of significant figures
- ◆ understand the meaning of scientific notation
- ◆ use scientific notation in practical problems
- ◆ be aware of the size of errors during estimation and approximation;
- ◆ understand and calculate different types of errors such as absolute errors, relative errors and percentage errors.
- ◆ be aware of the existence of irrational numbers and surds
- ◆ explore the representations of irrational numbers in the number line
- ◆ manipulate commonly encountered surds including the rationalization of the denominator in the form of \sqrt{a}
- ◆ appreciate the expressions of surds could be expressed in a more concise form
- ◆ understand the meaning of percentages and percentage changes
- ◆ apply percentage changes to solve simple selling problems
- ◆ apply percentages to solve problems involving simple and compound interests, growth and depreciation.
- ◆ apply percentages to solve further practical problems involving successive and component changes
- ◆ apply percentages to solve simple real-life problems involving taxation and rates
- ◆ understand the meaning of rate and ratio
- ◆ recognize the notation of $a : b$, $a : b : c$
- ◆ apply the ability in using rate, ratio to solve real-life problems including mensuration problems
- ◆ recognize some common and simple formulas which can be expressed as algebraic forms and be able to substitute values
- ◆ formulate simple algebraic equations/ inequalities to solve problems
- ◆ investigate, appreciate and observe the patterns of various number sequences such as

polygonal numbers, arithmetic and geometric sequences, Fibonacci sequence etc.

- ◆ use algebraic symbols to represent the number patterns
- ◆ obtain a preliminary idea of function such as input-processing-output concept
- ◆ recognize polynomial as a special example of algebraic expressions
- ◆ recognize the meaning of the terminology involved
- ◆ add, subtract, multiply polynomials involving more than one variable
- ◆ extend and explore the meaning of the index notation of numbers with negative exponents
- ◆ explore, understand and use the laws of integral indices to simplify simple algebraic expressions (up to 2 variables only)
- ◆ understand and compare numbers expressed in various bases in real-life situations
- ◆ foster a sense of place values in different numeral systems
- ◆ inter-convert between simple binary/hexadecimal numbers to decimal numbers
- ◆ understand factorization as a reverse process of expansion
- ◆ factorize polynomials by using common factors and grouping of terms
- ◆ factorize polynomials by using identities including difference of two squares; perfect square expressions; difference and sum of two cubes
- ◆ factorize polynomials by cross-method
- ◆ formulate and solve linear equations in one unknown
- ◆ solve literal equations
- ◆ plot and explore the graphs of linear equations in 2 unknowns
- ◆ formulate and solve simultaneous equations by algebraic and graphical methods
- ◆ be aware of the approximate nature of the graphical method
- ◆ explore simultaneous equations that are inconsistent or that have no unique solution
- ◆ explore the meaning of identities and distinguish between equations and identities
- ◆ discover and use the identities : difference of two squares; the perfect square expression; difference and sum of two cubes
- ◆ manipulate algebraic fractions with linear factors as denominators
- ◆ develop an intuitive idea of factorization of polynomials
- ◆ explore familiar formulas and substitute values of formulas
- ◆ perform change of subject in simple formulas but not including radical sign
- ◆ understand the meaning of inequality signs \geq , $>$, \leq and $<$
- ◆ explore the fundamental properties and some laws of inequalities
- ◆ solve simple linear inequalities in one unknown and represent the solution on the number line

(b) Measures, Shape and Space Dimension

- ◆ recognize the approximate nature of measurement and choose an appropriate measuring tool and technique for a particular purpose
- ◆ choose an appropriate unit and the degree of accuracy for a particular purpose
- ◆ develop estimation strategies in measurement

- ◆ handle and reduce errors in measurement
- ◆ estimate, measure and calculate lengths, areas, capacities, volumes, weights, rates, etc.
- ◆ find areas of simple polygons
- ◆ explore the formula for the area of a circle
- ◆ calculate circumferences and areas of circles
- ◆ understand and use the formulas for surface areas and volumes of cubes, cuboids, prisms and cylinders
- ◆ appreciate the application of formulas, besides measurement, in finding measures and be aware of the accumulated errors arisen
- ◆ explore the maximum area of figures for a given perimeter
- ◆ design a container by cutting squares from the 4 corners of a sheet of A4 paper to maximize the capacity of the container
- ◆ calculate arc lengths and areas of sectors
- ◆ understand and use the formulas for volumes of pyramids, circular cones and spheres
- ◆ understand and use the formulas for surface areas of right circular cones and spheres
- ◆ understand and use the relationships between sides, surface areas and volumes of similar figures
- ◆ distinguish between formulas for length, area, volume by considering dimensions
- ◆ recognize the common terms and notations in geometry such as line segments, angles, regular polygons, cubes and regular polyhedra (Platonic solids) etc.
- ◆ identify types of angles and polygons
- ◆ construct 3-D solids and explore their properties, such as Euler's formula
- ◆ sketch the 2-D representation of simple solids
- ◆ sketch the cross-sections of the solids
- ◆ overview tools of geometry and explore ways of using them to construct polygons, circles, parallel and perpendicular lines
- ◆ recognize some semi-regular polyhedra (Archimedean Solids)
- ◆ recognize reflectional and rotational symmetries in 2-dimensional (2-D) shapes
- ◆ recognize the effect on 2-D shapes after the transformation including reflection, rotation, translation, dilation/contraction etc.
- ◆ appreciate the symmetrical shapes around and transformations on shapes used in daily-life
- ◆ construct and design tile patterns
- ◆ recognize the properties for congruent and similar triangles
- ◆ extend the ideas of transformation and symmetry to explore the conditions for congruent and similar triangles
- ◆ recognize the minimal conditions in fixing a triangle
- ◆ identify whether 2 triangles are congruent/similar with simple reasons
- ◆ explore and justify the methods to construct angle bisectors, perpendicular bisectors and special angles by compasses and straight edges

- ◆ appreciate the construction of lines and angles with minimal tools at hand
- ◆ discuss the possibility of trisecting an angle by compasses and straight edges
- ◆ explore some shapes in fractal geometry
- ◆ recognize different types of angles
- ◆ explore and use the angle properties associated with intersecting lines and parallel lines
- ◆ explore and use the properties of lines and angles of triangles
- ◆ explore and use the formulas for the angle sum of the interior angles and exterior angles of polygons
- ◆ explore regular polygons that tessellate
- ◆ appreciate the past attempts in constructing some special regular polygons with minimal tools at hand
- ◆ construct some special regular polygons using straight edges and compasses
- ◆ discuss past attempts in constructing some special regular polygons such as 17-sided regular polygons
- ◆ extend the idea of symmetry in 2-D figures to recognize and appreciate the reflectional and rotational symmetries in cubes and tetrahedron
- ◆ explore and identify the net of a given solid
- ◆ imagine and sketch the 3-D objects from given 2-D representations from various views
- ◆ recognize the limitation of 2-D representations in identifying the solid
- ◆ explore the properties of simple 3-D object, such as identifying
 - the projection of an edge on one plane
 - the angle between a line and a plane
 - the angle between 2 planes
- ◆ investigate the reflectional and rotational symmetries in other regular polyhedra
- ◆ assemble a set of Soma Cube into a larger cube
- ◆ explore the number of regular polyhedral
- ◆ develop a deductive approach to study geometric properties through studying the story of Euclid and his book - *Elements*
- ◆ develop an intuitive idea of deductive reasoning by presenting proofs of geometric problems relating with angles and lines
- ◆ understand and use the conditions for congruent and similar triangles to perform simple proofs
- ◆ identify lines in a triangle such as medians, perpendicular bisectors etc.
- ◆ explore and recognize the relations between the lines of triangles such as the triangle inequality, concurrence of intersecting points of medians etc.
- ◆ explore and justify the methods of constructing centres of a triangle such as in-centre, circumcentre, orthocentre, centroids etc.
- ◆ prove some properties of the centres of the triangle
- ◆ recognize and appreciate different proofs of Pythagoras' Theorem including those in Ancient China

- ◆ recognize the existence of irrational numbers and surds
- ◆ use Pythagoras' Theorem and its converse to solve problems
- ◆ appreciate the dynamic element of mathematics knowledge through studying the story of the first crisis of mathematics
- ◆ investigate and compare the approaches behind in proving Pythagoras' Theorem in different cultures
- ◆ explore various methods in finding square root
- ◆ extend the idea of deductive reasoning in handling geometric problems involving quadrilaterals
- ◆ deduce the properties of various types of quadrilaterals but with focus on parallelograms and special quadrilaterals
- ◆ perform simple proofs related with parallelograms
- ◆ understand and use the mid-point and intercept theorems to find unknowns
- ◆ understand and use the rectangular and polar coordinate systems to describe positions of points in a plane
- ◆ able to locate a point in a plane by means of an ordered pair in the rectangular coordinate system
- ◆ describe intuitively the effects of transformation such as translation, reflection with respect to lines parallel to x-axis, y-axis and rotation about the origin through multiples of 90° on points in coordinate planes
- ◆ calculate areas of figures that can be cut into or formed by common 2-D rectilinear figures
- ◆ understand and use formulas of distance and slope
- ◆ use ratio to find the coordinates of the internal point of division and mid-point
- ◆ understand the conditions for parallel lines and perpendicular lines
- ◆ appreciate the analytic approach to prove results relating to rectilinear figures besides deductive approach
- ◆ choose and use appropriate methods to prove results relating to rectilinear figures
- ◆ explore the formula for external point of division
- ◆ understand the sine, cosine and tangent ratios for angles between 0° to 90°
- ◆ explore the properties and relations of trigonometric ratios
- ◆ explore the exact value of trigonometric ratios on special angles 30° , 45° , 60°
- ◆ rationalize the denominators such as $\sqrt{2}$
- ◆ apply trigonometric ratios to find measures of 2-D figures
- ◆ introduce the ideas of bearing, gradient, angle of elevation, angle of depression and solve related 2-dimensional problems

(c) Data Handling Dimension

- ◆ recognize various stages involved in statistics
- ◆ use simple methods to collect data so as to analyze posed problems
- ◆ be aware of the existence of different types of data (discrete and continuous)

- ◆ understand the criteria of organizing data and discuss different ways of organizing the same set of data
- ◆ construct and interpret simple diagrams including stem-and-leaf diagrams, pie charts, histograms, scatter diagrams, broken line graphs
- ◆ construct and interpret simple frequency polygons and curves, cumulative frequency polygons and curves
- ◆ be able to differentiate between histograms and bar charts
- ◆ explore the construction of diagrams and graphs with various tools besides paper and pencil
- ◆ compare the presentations of the same set of data by using various graphs or the same type of graphs but with different scales
- ◆ choose appropriate diagrams/graphs to present a given set of data
- ◆ read data from given frequencies in graphs (including percentiles, quartiles, median)
- ◆ read frequencies from given data in diagrams and graphs
- ◆ use some common wordings such as ‘most popular’, ‘most likely’, ‘equally likely’ to describe trends from line graphs
- ◆ discuss the impressions from graphs presented in various sources
- ◆ identify sources of deception in misleading graphs and their accompanying statements
- ◆ recognize the dangers of misinterpreting statistical data
- ◆ find mean, median and mode from a given set of ungrouped data
- ◆ find mean, median and modal class from a given set of grouped data
- ◆ be aware that the mean found for grouped data is an estimation
- ◆ compare 2 data sets with given mean, median and mode
- ◆ construct data sets with a given mean, median and mode
- ◆ discuss the relative merits of different measures of central tendency for a given situation
- ◆ explore and make conjectures on the effect of the central tendency of the data such as
 - (i) removal of a certain item from the data;
 - (ii) adding a common constant to the whole set of data;
 - (iii) multiplying the whole set of data by a common constant;
 - (iv) insertion of zero in the data set
- ◆ understand weighted mean and be aware of its use in various real-life situations such as Hang Seng Index, calculation of marks in a report etc.
- ◆ explore the meaning of probability through various activities
- ◆ have an intuitive idea about the relation between probability and the relative frequency as found in statistics or simulation activities
- ◆ investigate probability in real-life activities, including geometric probability
- ◆ compare the empirical and theoretical probabilities
- ◆ calculate the theoretical probability by listing the sample space and counting
- ◆ recognize the meaning of expectation

5. Learning Strategy

The curriculum strategies include methods of curriculum planning, material writing, teaching and learning to help students work towards the targets. In addressing the needs of our students to face the challenges of the 21st Century, the strategies used in this curriculum put emphases on

- ◆ the process of learning;
- ◆ catering for learner differences;
- ◆ the appropriate use of information technology (IT) in teaching and learning;
- ◆ the appropriate use of multifarious teaching resources.

However, it should be noted that no matter what emphasis of strategies is put in this curriculum, **the teacher is the key person** in the classroom teaching. Past studies review that liveliness and clear explanation of the teachers are students' main concerns. Students perceive that teachers have the responsibility of delivering clear explanation, designing and conducting activities in lessons, creating a good environment and showing concern for students' progress. The strategies mentioned below are just to remind teachers to be aware of the emphasis when designing and preparing teaching and learning activities to facilitate students' learning.

5.1 Process of Learning

Providing experiences and knowledge constructed in the learning process is considered as important as the end product. Sufficient time should be allocated for students to inquire, communicate, reason and conceptualize mathematical concepts so as to enable them to understand the knowledge thoroughly, to master the skills confidently and to foster a positive attitude towards learning. Students should also engage in the activities that enable them to practise problem-solving skills and to integrate and apply mathematical concepts.

Inquiring involves discovery or constructing knowledge through questioning or testing hypothesis. Posing questions to stimulate students to discover similarities or differences on different rules or asking students to test mathematical conjectures enables students to participate in a more active role in the learning process.

Communicating involves receiving and sharing meanings by using language, symbols, graphs and aesthetic forms. Listening, speaking, reading and writing are the important elements of communication which help students to interpret others' statements, state their ideas, clarify their meanings, refine their strategies to solve problems, hypothesize and construct simple arguments. Activities such as teachers posing questions for students to answer, small-group work, large-group discussions, presentation of individual and group projects (both written and oral form) provide platforms for students to communicate mathematically. Mathematics in itself can also be considered as other form of language. Teachers can guide students to see the difference of the mathematical language with those languages used in daily life and appreciate the precise nature of the mathematical language.

Reasoning involves developing plausible or logical arguments to deduce or infer conclusions. It is fundamental to the knowing and doing of mathematics. A mathematician or a student makes a conjecture by generalizing from a pattern of observations made in some particular cases (inductive reasoning) and then tests the conjecture by constructing either a logical

verification or a counter-example (deductive reasoning).

Conceptualizing involves organizing and reorganizing knowledge through perceiving and thinking about particular experiences in order to abstract patterns and ideas and to generalize from particular experiences. In teaching, teachers should pay due emphasis on helping students master the basic concepts of mathematics and create link between concepts.

The importance of problem solving in mathematics education has well been recognized. It involves

- ◆ understanding the problems;
- ◆ considering possible strategies and choosing an appropriate one to solve the problem;
- ◆ carrying out the plan; and
- ◆ justifying or evaluating the solution.

Concepts of mathematics are connected within a framework, which is 'multi-dimensional'. Concepts in one dimension very often are linked to concepts in other dimensions. For example, nearly all concepts in the dimensions, Measures, Shape & Space and Data Handling are inevitably connected with concepts in the Number and Algebra Dimension. Teachers should guide students to see the inter-relationship of mathematical knowledge among different dimensions.

Past studies point out that some people could not apply their mathematical knowledge learnt in schools to solve their real-life problems. Activities to foster students' application of mathematical knowledge to their real-life situations and to be aware of the link between school knowledge and their real-life applications should also be provided. Teachers could ask students to extract some daily-life problems appeared in the newspaper, advertisements, internet and so on for discussion.

5.2 Catering for Learner Differences

The curriculum is structured with the Foundation Part identified to facilitate teachers to tailor the curriculum for their students' learning needs. Teachers could focus on teaching the Foundation Part of the whole syllabus so as to provide appropriate quantities and a variety of activities for students to conceptualize, construct knowledge and communicate mathematically. For more able students, activities on enrichment topics could also be provided to broaden students' horizon of mathematical knowledge and enhance their interest in mathematics.

Teachers are advised to give due considerations to various aspects such as grouping students of similar ability together, teaching/learning activities, resources and assessment. Teachers find teaching in mixed ability classes harder than teaching in classes where students are relatively close in ability. However, there can be a negative impact on the self-image of those students placed in lower streams. No matter how the students are organized, it is inevitable that students in a class will differ in abilities, needs and interests. Teachers need to use selectively whole class teaching, group work and individual teaching as appropriate to the task in hand.

In daily classroom teaching, teachers could cater for learner differences by providing students

with different tasks or activities graded according to the levels of difficulty, so that students work on tasks or exercises that match their stages of progress in learning. For less able students, tasks should be relatively simple and fundamental in nature. For abler students, tasks assigned should be challenging enough to cultivate as well as to sustain their interest in learning. Alternatively, teachers could also provide students with the same task or exercise, but vary the amount and style of support they give, i.e. giving more clues, breaking the more complicated problems into several parts for weaker students.

The use of IT could also provide another solution for teachers to cater for learner differences. Different levels of exercises or activities are always included in the educational software packages. Teachers could make use of these software packages for students with different abilities to work through at their own pace and at their levels of ability. The facilities to record students' performance in these software packages could also provide information for teachers to diagnose students' misconceptions or general weaknesses so as to re-adjust the teaching pace or re-consider the teaching strategies.

5.3 Appropriate Use of Information Technology (IT)

Traditional teaching is always conducted with chalk and talk. Audio-visual devices such as television in the past 2 decades provide another alternative activity for mathematics teaching and learning. The wide spread use of computers and calculators in this decade provides further alternative for the teaching and learning in mathematics. The advantages of using IT over other tools include:

- i. **interactive learning** which enables learners to obtain “immediate” feedback for testing hypothesis, readjust the problem-solving strategies, see connections between formulae and their corresponding graphs by changing the values of relevant parameters;
- ii. colourful, attractive and **dynamic graphics** which provide graphical images of various functions, 2-D and 3-D models, animation activities, studying geometry dynamically;
- iii. **large memories** that enable students to compute complicated expressions, work with real data, study real-life statistical problems;
- iv. **fast speed** which enables students to produce many examples in a short period of time for the observation of patterns so that they are more willing to try different strategies to solve problems.

IT in school mathematics education could be considered as:

- i. a **tool** - Teachers could use presentation software as a ‘blackboard’ to present notes, geometry software to demonstrate graphs and models, zoom-in and zoom-out facilities in some graphing calculators or graph plotter software to approximate the solution of equations from their graphs. Students could use symbolic manipulation software to manipulate complicated expressions, present statistical graphs with graphical facilities in spreadsheet, submit homework through e-mail etc.
- ii. a **tutor** - Many mathematical software packages, in the form of CD-ROMs, act as a tutor to teach students mathematical concepts. These software packages illustrate mathematical concepts with texts, graphics, and sound and with graded exercises or

tests. Students could use these software packages to revise the contents learnt in the classroom, remedy the weak areas or even learn new topics prior to teachers' teaching. They could further consolidate their learning with appropriate exercises chosen for their levels of difficulty at their own pace.

- iii. a **tutee** - Teachers could develop their own educational programs using spreadsheets or other programming languages to suit their own teaching strategies. Students could write programs in the language such as LOGO to explore properties of geometric figures.

Both teachers and students of mathematics at all secondary levels are expected to use IT intelligently and critically. They must be able to decide when to use the available technology. For example, students have to decide whether to use calculator, or work mentally to solve the equation $x^2-3x-4 = 0$, and teachers have to decide whether to use computers or the real objects to demonstrate the projections of 3-D models, and which software is more appropriate for the task.

Besides, varieties of group work to facilitate collaborative learning or investigative approach in learning with IT should also be considered. Class-work or home assignment should emphasize upon concept development and understanding instead of manipulating complicated expressions or symbols or just rote memorization of formulae.

5.4 Appropriate Use of Multifarious Teaching Resources

Besides IT, there are other teaching resources that teachers could make use of in planning and conducting the teaching and learning activities:

- ◆ textbooks or teaching packages
- ◆ reference books
- ◆ audio-visual tapes such as ETV programs
- ◆ instruments and other equipment for drawing shapes and making models
- ◆ materials found around such as newspapers, advertising leaflets, maps, etc.
- ◆ resources found in libraries / resource centres etc.

Textbooks are one of the key resources for teaching and learning. They should be used to guide students to acquire knowledge, skills and develop attitudes as well as to assimilate concepts and process information in the texts and graphics therein. Textbooks should not be treated as a mean of imparting factual knowledge or just providing exercises to drill students on the manipulative skills. Some textbooks tend to provide exercises more than those required in the syllabus so far as the level of difficulty and the amount are concerned. Teachers should therefore exercise discretion in selecting suitable parts to teach and avoid over-teaching or over-drilling.

Besides textbooks, teachers could make use of teaching packages or references distributed to schools. Some of these teaching packages or references provide ready-made worksheets, notes or information that could be used in the classroom with slight modifications. ETV programs could provide information that cannot be presented vividly by just chalk-and-talk. For instance, it is interesting to watch a video on the historical development in approximating the value of π or the applications of trigonometric ratios in surveying.

Mathematical language is progressively abstract. Different learning theories point out the importance of providing students with rich experiences in manipulating concrete objects as a foundation for the symbolic development. Teachers could make use of teaching aids such as 3-D models, blocks, graph boards, protractors, pairs of compasses, rulers, measuring equipment, etc. to demonstrate the mathematical concepts and allow students to “play” around before asking students to “structure and apply” the concepts.

Materials around such as advertisement leaflets, statistical reports presented in the media, graphs printed in the newspaper could supply up-to-date information that cannot be found in other sources and they could easily arouse students’ interest in learning. In addition, a large quantity of related materials for teachers’ reference can be obtained from libraries or various resource centres operated by the Education Department, such as School Based Resource Centre, TOC Resource Centre(s). In 1990s, internet becomes another popular source for sharing and retrieving information. **Gathering and selecting information** from these sources would be another major learning activities in the 21st century.

6. Subject Characteristics

Mathematics pervades all aspects of life, whether at home, in civic life or in the workplace. It has been central to nearly all major scientific and technological advances. Also, many of the developments and decisions made in industry and commerce, the provision of social and community services as well as government policy and planning, rely to an extent on the use of mathematics.

It is important for our students to gain experience and build up the foundation skills and knowledge in mathematics that can facilitate their future development in various aspects. It is also important that our students are able to value mathematics and appreciate the beauty of mathematics after mathematics education in school. In the information explosion era, there are drastic changes both in our society and in the background of our students. It is vital that the curriculum should undergo continuous review and renewal in order to meet the needs of our students and the community.

Mathematics is essential in the school curriculum of Hong Kong, as it is:

- ◆ a powerful means of communication;
- ◆ a tool for studying other disciplines;
- ◆ an intellectual endeavour and a mode of thinking; and
- ◆ a discipline, through which students can develop their ability to appreciate the beauty of nature, think logically and make sound judgments.

Mathematics is valuable to help students develop necessary skills for lifelong learning. It is an integral part of general education and hence an important KLA in the Hong Kong school curriculum.

7. Teaching Staff

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8. Appendices

(a) Useful links:

- ◆ Ask DR. Math, forum.swarthmore.edu/dr.math
- ◆ O.S.U. Math. Edu. Centre, www.math.okstate.edu/archives/index.html
- ◆ Graph, www.langara.bc.ca/mathstats/resource/GraphExplorer/popup.htm
- ◆ Understanding Algebra, www.edteach.com/algebra/
- ◆ The Math Forum, mathforum.com/
- ◆ Math Tutor, www.fliegler.com/mathman.htm
- ◆ Cabri Geometry II, www.ti.com/calc/
- ◆ Geo , forum.swarthmore.edu/sketchpad/gsp.gallery/gallery.html#directory
- ◆ Peanut Software for Windows, academy.exeter.edu/~rparris/
- ◆ Guide to Available Mathematical Software, gams.nist.gov/
- ◆ Ksoft (Graphmatica) (Graphs drawing software), www.graphmatica.com/
- ◆ Clinical (Graph Paper Printer), perso.easynet.fr/~philimar/
- ◆ Equation Grapher, www.mfsoft.com/equationgrapher/index.html
- ◆ WinViSta 5.6.3 (Statistics), www.visualstats.org/

(b) Glossary

abbreviation 簡寫符號，簡寫	algebraic 代數的
abscissa 橫坐標	algebraic equation 代數方程（式）
absolute complement 絕對補集	algebraic expression 代數式
absolute error 絕對誤差	algebraic fraction 代數分式，代數分數式
absolute inequality 絕對不等式	algebraic inequality 代數不等式
absolute maximum 絕對極大值	algebraic number 代數數
absolute minimum 絕對極小值	algebraic operation 代數運算
absolute monotonic 絕對單調	algebraically closed 代數封閉
absolute value 絕對值	algorithm 算法，規則系統
accumulation 累積	alternate angle （交）錯角
accumulative 累積的	alternate segment 內錯弓形，交錯弓形
accuracy 準確度	alternating series 交錯級數
acute angle 銳角	alternative hypothesis 擇一假設，備擇假設，另一假設
acute triangle 銳角三角形	alternate exterior angle 外錯角
add 加	alternate interior angle 內錯角
addition 加法	altitude 高（度），頂垂線，高線
addition formula 加法公式	ambiguous case 二義情況
addition law 加法定律	amplitude (1) 幅度；(2) 幅角；(3) 振幅
additive inverse 加法逆元，加法反元	analysis 分析，解析
adjacent angle 鄰角	analytic geometry 解析幾何
adjacent side 鄰邊	angle 角
adjoint matrix 伴隨矩陣	angle at the centre 圓心角
algebra 代數（學）	

angle at the circumference 圓周角	阿剌伯數字系統
angle between a line and a plane 直線與平面的交角	arbitrary 任意
angle between two planes 兩平面的交角	arbitrary constant 任意常數
angle bisection 角平分	arc 弧
angle bisector 角平分線，分角線	arc cosecant 反餘割
angle of depression 俯角	arc cosine 反餘弦
angle of elevation 仰角	arc cotangent 反餘切
angle of greatest slope 最大斜率的角	arc length 弧長
angle of inclination 傾斜角	arc secant 反正割
angle of intersection 相交角，交角	arc sine 反正弦
angle of projection 投射角	arc tangent 反正切
angle of rotation 旋轉角	Archimedean Solid 阿基米德（立）體
angle sum of a triangle 三角形內角和	area 面積
angles at a point 同頂角	Argand diagram 阿根圖，阿氏圖
angles in the alternate segment 內錯弓形的圓周角，交錯弓形的圓周角	argument (1)論證；(2) 輻角
angles in the same segment 同一弓形的圓周角	argument of a complex number 複數的輻角
angular 角度的，角的	argument of a function 函數的自變數
angular bisector 角平分線，分角線	arithmetic 算術
anticlockwise direction 逆時針方向，反時針方向	arithmetic mean (1)算術平均數；(2)等差中項，算術中項
anti-cosecant 反餘割	arithmetic progression (1)等差數列，算術數列；(2)等差級數，算術級數
anti-cosine 反餘弦	arithmetic sequence 等差數列，算術數列
anti-cotangent 反餘切	arithmetic series 等差級數，算術級數
antiderivative 反導數，逆導數，反微商，逆微商	array 陣列，數組
antilogarithm 逆對數，反對數	ascending order 遞升序
anti-secant 反正割	ascending powers of x x 的升幂
anti-sine 反正弦	assertion 斷言，斷定
anti-symmetric 反對稱	associative law 結合律
anti-tangent 反正切	assumption 假定，假設
apex 頂點	asymmetrical 非對稱
approach 接近，趨近	asymptote 漸近線
approximate value 近似值	asymptotic error constant 漸近誤差常數
approximation 近似，略計，逼近	augmented matrix 增廣矩陣
Arabic numerals 阿拉伯數字，阿剌伯數字，阿拉伯數碼，阿剌伯數碼	auxiliary angle 輔助角
Arabic system of notation 阿拉伯數字系統，	auxiliary circle 輔助圓
	auxiliary equation 輔助方程（式）
	average 平均，平均數，平均值
	average speed 平均速率
	axiom 公理，公設

axis 軸	bounded above 有上界(的), 上有界(的)
axis of reflectional symmetry 反射對稱軸	bounded below 有下界(的), 下有界(的)
axis of reflective symmetry 反射對稱軸	bounded function 有界函數
axis of revolution 旋轉軸	bounded sequence 有界數列, 有界序列
axis of rotation 旋轉軸	box plot 箱形圖, 框線圖
axis of rotational symmetry 旋轉對稱軸	box-and-whisker diagram 箱形圖, 框線圖
axis of symmetry 對稱軸	breadth 闊(度), 寬(度)
back substitution 回代	broken line graph 折線圖
bar chart 棒形圖, 長條圖	calculate 計算
base (1) 底_____ ; (2) 基, 基數	calculator 計算機, 計算器
base angle 底角	calculus (1) 微積分(學); (2) 演算
base area 底面積	cancel (1) 消去; (2) 約
base line 底線	cancellation law 消去律
base number 底數, 基數	canonical 典型, 標準
base of a logarithm 對數的底	capacity 容量
basis 基, 基底	Cartesian coordinates 笛卡兒坐標
Bayes theorem, Bayes' theorem 貝葉斯定理	Cartesian equation 笛卡兒方程(式)
bearing 方位, 方向	Cartesian product 笛卡兒積
bell-shaped curve 鐘形圖	categorical data 分類數據
Bernoulli distribution 伯努利分佈, 伯努利分布	category 類型, 範疇
Bernoulli trials 伯努利試驗	catenary 懸鏈線
bias 偏差, 偏倚	Cauchy sequence 柯西序列
biconditional 雙條件式, 雙條件句	Cauchy's principal value 柯西主值
bijection 一一映射, 雙射, 對射	Cauchy-Schwarz inequality 柯西-許瓦爾茲不等式
bijection 一一映射, 雙射, 對射	ceiling function 上取整函數
bijection 一一映射, 雙射, 對射	centimetre (cm) 厘米, 公分
bijection 一一映射, 雙射, 對射	central limit theorem 中心極限定理
bimodal distribution 雙峰分佈, 雙峰分布	central line 中線
binary number 二進制數, 二進位數	central tendency 集中趨勢
binary operation 二元運算	centre 中心, 心
binomial 二項式	centre of a circle 圓心
binomial distribution 二項分佈, 二項分布	centre of gravity 重心
binomial expression 二項式	centre of mass 質量中心
binomial series 二項級數	centroid 形心, 距心
binomial theorem 二項式定理	certain event 必然事件
bisect 平分, 等分	Ceva Theorem, Ceva's Theorem 塞瓦定理
bisector 等分線, 平分線	chain rule 鏈式法則
Boolean algebra 布爾代數	chance 機會
boundary condition 邊界條件	change of axes 坐標軸的變換
boundary line 界(線), 邊界	
bounded 有界(的)	

change of base 基變換	coding 編碼
change of subject 主項變換	co-domain 上域
change of variable 變量變換，換元	coefficient 係數
characteristic equation 特徵方程（式）	coefficient of variation 變異係數，變差係數
characteristic function 特徵函數	cofactor 餘因子，餘因式
characteristic of logarithm 對數的首數，對數的定位部	cofactor matrix 餘因子矩陣，餘因式矩陣
characteristic root 特徵根	coincide 疊合，重合
chart 圖，圖表	collection of terms 併項
check digit 校驗位	collinear 共線
checking computations 驗算	collinear planes 共線面
chord 弦	column 列
chord at contact 切點弦	column matrix 列矩陣
circle 圓	column vector 列向量，列矢量
circular 圓形，圓的	combination 組合
circular function 圓函數，三角函數	common chord 公弦
circular measure 弧度法	common denominator 同分母，公分母
circular permutation 環形排列，圓形排列，循環排列	common difference 公差
circumcentre 外心，外接圓心	common divisor 公約（數）
circumcircle 外接圓	common factor 公因數，公因子
circumference 圓周	common logarithm 常用對數
circumradius 外接圓半徑	common multiple 公倍（數）
circumscribed circle 外接圓	common ratio 公比
class (1)組；(2)類	common tangent 公切線
class boundary 組界	commutative 交換的
class interval 組區間，組距	commutative law 交換律
class limit 組限	commutative property 交換性（質）
class mark 組中點，組標	comparable 可比較（的）
classical theory of probability 古典概率論	compass (1)圓規；(2)指南針，羅盤
classify (1)分類；(2)分組	compasses 圓規
clinometer 測斜儀	compatible 相容（的）
clockwise direction 順時針方向	complement (1)餘，補，補餘；(2)餘集，補集
closed convex region 閉凸區域	complementary angle 餘角
closed interval 閉區間	complementary equation 補餘方程（式）
closed sentence 閉（合）（語）句，封閉語句	complementary event 互補事件
coaxial 共軸	complementary events 對立事件
coaxial circles 共軸圓	complementary function 餘函數
coaxial system 共軸系	complementary law 互餘律，互補律，補餘律
	complementary set 餘集，補集
	completing the square 配方
	complex conjugate 複共軛（的）

complex fraction	繁分數	conic	二次曲線，圓錐曲線
complex number	複數	conic section	二次曲線，圓錐曲線
complex number plane	複數平面	conical pendulum	圓錐擺
complex root	複數根	conjecture	猜想
component	分量	conjugate	共軛
composite function	複合函數，合成函數	conjugate axis	共軛軸
composite mapping	複合映射，合成映射	conjugate complex number	共軛複數
composite number	(複)合數，合成數	conjugate diameter	共軛(直)徑
composition of functions	函數的複合，函數的合成	conjugate hyperbola	共軛雙曲線
composition of mappings	映射的複合，映射的合成	conjugate imaginary number	共軛虛數
compound angle	複角	conjugate radical	共軛根式
compound angle formula	複角公式	conjugate surd	共軛根式，共軛不盡根
compound bar chart	複合棒形圖	conjunction	合取
compound statement	複合命題，複合敘述	connective	連詞
computation	計算	consecutive integers	連續整數
computer	電腦，電子計算機	consecutive numbers	連續數，相鄰數
concave	凹	consequence	結論，推論
concave downward	凹向下的	consequent	條件，後項
concave upward	凹向上的	consistency condition	相容條件
concentric circles	同心圓	consistent	一致的，一貫的，相容的
concept	概念	consistent estimator	相容估計量
conclusion	結論	constant	常數
concurrent	共點	constant of integration	積分常數
concylic points	共圓點	constraint	約束，約束條件
condition	條件	construction	作圖
conditional	條件句，條件式	construction of equation	方程(式)的設立
conditional identity	條件恆等式	continued proportion	連比例
conditional inequality	條件不等式	continued ratio	連比
conditional probability	條件概率	continuity	連續性
cone	錐，圓錐(體)	continuity correction	連續校正
confidence coefficient	置信係數	continuous	連續的
confidence interval	置信區間	continuous data	連續數據
confidence level	置信水平	continuous function	連續函數
confidence limit	置信極限	continuous random variable	連續隨機變量
confocal section	共焦圓錐曲線	contraction	收縮，短縮，縮小
congruence (1)全等；(2)同餘		contradiction	矛盾
congruence class	同餘類	contrapositive	逆反命題
congruent triangles	全等三角形	converge	收斂
		convergence	收斂性
		convergent	收斂的

convergent iteration	收斂的迭代	cross-multiplication	交叉相乘
convergent sequence	收斂序列	cross-section	橫切面，橫截面，截痕
convergent series	收斂級數	cryptography	密碼學
converse	逆（定理）	cube	正方體，立方，立方體
converse of a relation	逆關係	cube root	立方根
converse theorem	逆定理	cubic	三次方，立方，三次（的）
conversion	轉換	cubic equation	三次方程（式）
convex	凸	cubic roots of unity	單位的立方根
convex polygon	凸多邊形	cuboid	長方體，矩體
convexity	凸性	cumulative	累積的
coordinate	坐標	cumulative distribution function	累積分佈函數，累積分布函數
coordinate geometry	解析幾何，坐標幾何	cumulative error	累積誤差
coordinate system	坐標系	cumulative frequency	累積頻數，累積頻率
coplanar	共面	cumulative frequency curve	累積頻數曲線
coplanar lines	共面線	cumulative frequency distribution	累積頻數分佈，累積頻數分布
co-prime	互質，互素	cumulative frequency polygon	累積頻數多邊形，累積頻率直方圖
corollary	系定理，系，推論	curvature of a curve	曲線的曲率
correct to	準確至，取值至	curve	曲線
correlation	相關	curve sketching	曲線描繪（法）
correlation coefficient	相關係數	curve tracing	曲線描跡（法）
corresponding angles (1)	同位角；(2)對應角	curved surface	曲面
corresponding element	對應元	curved surface area	曲面面積
corresponding sides	對應邊	cyclic expression	輪換式
cosecant	餘割	cyclic permutation	圓形排列
cosine	餘弦	cyclic quadrilateral	圓內接四邊形
cosine formula	餘弦公式	cycloid	旋輪線，擺線
cotangent	餘切	cylinder	柱（體），圓柱（體）
countable	可數（的）	cylindrical	圓柱形的
countable set	可數集	datum [data]	數據
countably infinite	可數無限	De Moivre's theorem	棣美弗定理
counter clockwise direction	逆時針方向，反時針方向	De Morgan's law	德摩根律
counter example	反例	decagon	十邊形
counting	數數，計數	decile	十分位數
Cramer's rule	克萊瑪法則	decimal	小數
critical point	臨界點	decimal part	小數部分
critical region	臨界域	decimal place	小數位
critical value	臨界值	decimal point	小數點
cross product	叉積，向量積，矢量積		
cross-method	十字相乘法		

decoding 譯碼	deviation from the mean 離均差
decrease 遞減	diagonal 對角線
decreasing function 遞減函數，下降函數	diagonal matrix 對角矩陣
decreasing sequence 遞減序列，下降序列， 遞減數列，下降數列	diagram 圖，圖表
decreasing series 遞減級數，下降級數	diameter 直徑
decrement 減量	diameter of a conic 二次曲線的直徑
deduce 演繹	difference 差
deduction 推論	difference equation 差分方程（式）
deductive reasoning 演繹推理	difference of sets 差集
definite 確定的，定的	differentiable 可微
definite integral 定積分	differential 微分
definition 定義	differential coefficient 微商，微分係數
degenerated conic section 降級圓錐曲線	differential equation 微分方程（式）
degree (1) 度；(2) 次	differential mean value theorem 微分中值定 理
degree of a polynomial 多項式的次數	differentiate 求... ... 的導數
degree of accuracy 準確度	differentiate from first principle 從基本原理 求導數
degree of confidence 置信度	differentiation 微分法
degree of freedom 自由度	digit 數字
degree of ordinary differential equation 常微 分方程（式）次數	dilation 伸縮，擴大
degree of precision 精確度	dimension (1)維（數），度；(2)大小，尺寸； (3)因次，量綱
denary number 十進數	direct proportion 正比（例）
denominator 分母	direct variation 正變（分）
dependence (1)相關；(2)應變	directed angle 有向角
dependent event 相關事件，相依事件，從屬 事件	directed line 有向（直）線
dependent variable 應變量，應變數	directed line segment 有向線段
derivable 可導	directed number 有向數
derivative 導數，微商	direction 方向，方位
derived curve 導函數曲線	direction angle 方向角
derived function 導函數	direction cosine 方向餘弦
derived statistics 推算統計資料，派生統計資 料	direction number 方向數
descending order 遞降序	direction ratio 方向比
descending powers of x x 的降冪	directrix 準線
descriptive statistics 描述（性）統計（學）	Dirichlet function 狄利克雷函數
detached coefficients 分離係數（法）	disc method 圓盤法
determinant 行列式	discontinuity 不連續性
deviation 偏差，變差	discontinuous 間斷（的），非連續（的）， 不連續（的）

discontinuous point 不連續點	double angle 二倍角
discrete 離散 (的)	double angle formula 二倍角公式
discrete data 離散數據	double root 二重根
discrete probability distribution 離散概率分佈, 離散概率分布	dual 對偶 (的)
discrete random variable 離散隨機變量, 離散隨機變數	duality 對偶性
discrete uniform distribution 離散均勻分佈, 離散均勻分布	dummy variable 啞變量, 假變量
discriminant 判別式	eccentric angle 離心角
disjoint 不相交的	eccentric circles 離心圓
disjoint sets 不相交的集	eccentricity 離心率
disjunction 析取	echelon form 梯陣式
dispersion 離差	echelon matrix 梯矩陣
displacement 位移	edge 稜, 棱, 邊
disprove 反證	efficient estimator 有效估計量
distance 距離	eigenvalue 本徵值
distance formula 距離公式	eigenvector 本徵向量
distinct roots 相異根	element 元 (素)
distinct solution 相異解	elementary event 基本事件
distribution 分佈, 分布	elementary function 初等函數
distributive law 分配律	elementary row operation 基本行運算
diverge 發散	elimination (1)消去; (2)消元法
divergence 發散 (性)	ellipse 橢圓
divergent 發散的	ellipsoid 橢球體
divergent iteration 發散性迭代	empirical data 經驗數據, 實驗數據
divergent sequence 發散序列	empirical formula 經驗公式, 實驗公式
divergent series 發散級數	empirical probability 經驗概率, 實驗概率
divide 除	empty set 空集
dividend (1) 被除數, 被除式; (2) 股息	enclosure 界限
divisible 可整除	encoding 編碼
division 除法	end point, endpoint 端點
division algorithm 除法算式	entire surd 整方根
divisor 除數, 除式, 因子	epicycloid 外擺線
divisor of zero 零因子	equal 相等 (的), 等於
dodecagon 十二邊形	equal roots 等根
dodecahedron 十二面體	equal sets 等集
domain 定義域	equality 等 (式)
dot 點	equality sign 等號
dot product 點積	equally likely event 等可能事件
	equation 方程 (式)
	equation of a straight line 直線方程 (式)
	equation of locus 軌跡方程 (式)

equiangular 等角 (的)	extension 外延, 延長, 擴張, 擴充
equidistant 等距 (的)	extension of a function 函數的擴張
equilateral 等邊 (的)	exterior angle 外角
equilateral triangle 等邊三角形	external bisector 外 (平) 分角線, 外 (角) 平分線
equiprobable 等概率的	external division 外分
equiprobable space 等概率空間	external point of division 外分點
equivalent 等價 (的)	extreme point 極值點
error 誤差	extreme value 極值
error estimate 誤差估計	extremum 極值
error term 誤差項	face 面
estimate 估計, 估計量	factor 因式, 因子, 因數
estimator 估計量	factor theorem 因式定理, 因子定理
Euclidean algorithm 歐幾里得算法	factorial 階乘
Euclidean geometry 歐幾里得幾何	factorization 因式分解, 因子分解, 因數分解
Euler's formula 歐拉公式, 尤拉公式	factorization of polynomial 多項式因式分解, 多項式因子分解
evaluate 計值	fallacy 謬誤
even function 偶函數	false 假 (的)
even number 偶數, 雙數	falsehood 假值
evenly distributed 均勻分佈的, 均勻分布的	family 族
event 事件	family of circles 圓族
exact differential form 恰當微分形式	family of concentric circles 同心圓族
exact solution 準確解, 精確解, 真確解	family of straight lines 直線族
exact value 準確值, 精確值, 真確值	feasible solution 可行解, 容許解
exclusive 不包含	Fibonacci number 斐波那契數, 黃金分割數
exclusive disjunction 不包含性析取	Fibonacci sequence 斐波那契數列, 斐波那契序列
exclusive events 互斥事件	figure (1) 圖 (形); (2) 數字; (3) (數) 位
exhaustive event 窮舉事件	finite 有限 (的), 有窮 (的)
existential quantifier 存在量詞	finite population 有限總體
expand 展開	finite probability space 有限概率空間
expansion 展式	finite sequence 有限數列, 有限序列
expectation 期望	finite series 有限級數
expectation value, expected value 期望值, 預期值	finite set 有限集
experimental design 試驗設計, 實驗設計	first approximation 首近似值
explicit function 顯函數	first derivative 一階導數
exponent 指數	first order differential equation 一階微分方程 (式)
exponential function 指數函數	
exponential order 指數階, 指數級	
express ... in terms of... 以... ... 表達	
expression 式, 數式	

first quadrant 第一象限
first quartile 第一四分位數
first term 首項
fixed point 不動點，(固)定點
fixed point iteration method 定點迭代法
floor function 下取整函數
focal axis 焦軸
focal chord 焦弦
focal length 焦距
focus [foci] 焦點
folium of Descartes 笛卡兒葉形線
foot of perpendicular 垂足
for all x 對所有 x
for any x 對任一 x
for each x , for every x 對每一 x
formal proof 形式證明
formula [formulae] 公式
four fundamental operations of arithmetic 算術(基本)四則運算
four-figure table 四位數表
fourth quadrant 第四象限
fraction 分數，分式
fraction in lowest term 最簡分數
fractional index 分數指數
fractional inequality 分式不等式
free vector 自由向量，自由矢量
frequency 頻數，頻率
frequency distribution 頻數分佈，頻數分布，頻率分佈，頻率分布
frequency polygon 頻數多邊形，頻率多邊形
frustum 平截頭體，平截頭台，平截頭墩
function 函數
function of function 函數的函數，複合函數，疊函數
functional notation 函數記號
fundamental theorem of algebra 代數基本定理
fundamental theorem of calculus 微積分基本定理
Gaussian distribution 高斯分佈，高斯分布

Gaussian elimination 高斯消去法
general form 一般式
general solution 通解，一般解
general term 通項
geoboard 幾何板
geometric distribution 幾何分佈，幾何分布
geometric mean (1)幾何平均數；(2)等比中項
geometric progression (1)等比數列，幾何數列；(2)等比級數，幾何級數
geometric sequence 等比數列，幾何數列
geometric series 等比級數，幾何級數
geometry 幾何(學)
global maximum 全局極大(值)，總體極大(值)，整體極大(值)
global minimum 全局極小(值)，總體極小(值)，整體極小(值)
golden ratio 黃金(分割)比
golden section 黃金分割
Gougu theorem 勾股定理
gradient 斜率，傾斜量
gram (g) 克
graph 圖，圖形，圖像
graph paper 圖表紙
graphical method 圖解法
graphical representation 圖示，以圖像表達
graphical solution 圖解
greatest common divisor (gcd) 最大公因數，最大公因子
greatest term 最大項
greatest value 最大值
grid lines 網格線
grouped data 分組數據，分類數據
grouping terms 併項
half angle 半角
half-angle formula 半角公式
half-closed interval 半開區間
half-open interval 半開區間
head (錢幣的)正面
height 高(度)
helix 螺旋線

hemisphere 半球體，半球	imaginary number 虛數
hendecagon 十一邊形	imaginary part 虛部
heptadecagon 十七邊形	imaginary root 虛根
heptagon 七邊形	imaginary unit 虛數單位
Heron formula, Heron's formula 希羅公式，海倫公式	implication 蘊涵（式），蘊含（式）
heterogeneous 非齊次的	implicit definition 隱定義
hexadecimal number 十六進制數，十六進位數	implicit function 隱函數
hexagon 六邊形	imply 蘊涵，蘊含
hexahedron 六面體	impossible event 不可能事件
higher order derivative 高階導數	improper fraction 假分數
highest common factor (H.C.F.) 最高公因式，最高公因子，最大公因數	incentre 內心
Hindu-Arabic numerals 印度—阿拉伯數字，印度—阿剌伯數字，印度—阿拉伯數碼，印度—阿剌伯數碼	incircle 內切圓
histogram 組織圖，直方圖，矩形圖	inclination 傾角，斜角
homogeneous 齊次的	inclined plane 斜面
horizontal 水平（的）	included angle 夾角
horizontal asymptote 水平漸近線	inclusion mapping 包含映射
horizontal component 水平分量	inclusive 包含的，可兼的
hour (h) 小時	inclusive disjunction 包含性析取，可兼析取
hyperbola 雙曲線	inconsistent 不相容（的），不一致（的）
hyperbolic function 雙曲函數	increasing function 遞增函數
hypotenuse 斜邊	increasing sequence 遞增數列，遞增序列
hypothesis 假設	increasing series 遞增級數
hypothesis testing 假設檢驗	increment 增量
icosahedron 二十面體	indefinite integral 不定積分
identical 恆等（的）	indefinite integration 不定積分法
identity (1)恆等（式）；(2)單位元	independence (1)獨立；(2)自變
identity element 單位元（素）	independent equations 獨立方程（式）
identity law 同一律	independent events 獨立事件
identity mapping 恆等映射，恆同映射	independent variable 自變量，自變數，獨立變數，獨立變量
identity matrix 單位矩陣	indeterminate (1) 不定的；(2) 不定元，未定元
identity relation 恆等關係（式）	indeterminate coefficient 不定係數，未定係數
if and only if (iff) 當且僅當	indeterminate form 不定（形）式，未定（形）式
image (1)象；(2)像（點）	index [indices] 指數，指標
imaginary axis 虛軸	induction hypothesis 歸納（法）假設
imaginary circle 虛圓	inequality (1)不等式；(2)不等
	inequality sign 不等號
	infer 推斷

inference 推論

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inferential statistics 推論(性)統計(學)

infinite 無窮(的), 無限(的)

infinite decimal 無盡小數, 不盡小數, 無窮小數, 無限小數

infinite population 無窮總體, 無限總體, 無窮母體, 無限母體

infinite sequence 無窮序列, 無限序列, 無窮數列, 無限數列

infinite series 無窮級數, 無限級數

infinite set 無窮集, 無限集

infinitely many 無窮多, 無限多

infinitesimal 無窮小(的), 無限小(的)

infinity 無窮(大), 無限(大)

inflection point 拐點, 反曲點

inflexion point 拐點, 反曲點

inherent error 固有誤差

initial approximation 初始近似值

initial condition 原始條件, 初值條件

initial point 起點, 始點

initial side 始邊

initial value 初值, 始值

initial-value problem 初值問題

injection 單射, 內射

injective function 單射函數, 內射函數

inner product 內積

inscribed circle 內切圓

integer 整數

integrable 可積(的)

integrable function 可積函數

integral 積分

integral index 整數指數

integral mean value theorem 積分中值定理

integral part 整數部分

integral solution 整數解

integral value 整數值

integrand 被積函數

integrate 積, 積分, 求.....的積分

integrating factor 積分因子

integration 積分法

integration by parts 分部積分法

integration by substitution 代換積分法, 換元積分法

integration constant 積分常數

intercept (1)截距; (2)截段

intercept form 截距式

intercept theorem 截線定理

interior angle 內角

interior angles on the same side 同傍內角

interior opposite angle 內對角

intermediate value theorem 介值定理

internal bisector 內分角線, (內)角平分線

internal division 內分

internal point of division 內分點

interpolating polynomial 插值多項式

interpolation 插值(法), 內插(法)

interquartile range 四分位數間距, 內四分位距

intersection (1)交集; (2)(相)交; (3)交點

interval 區間

interval estimation 區間估計, 區域估計

invalid argument 不對確論證

invariance 不變性

invariant (1)不變的; (2)不變量, 不變式

inverse 逆(的), 反(的)

inverse circular function 反圓函數, 反三角函數

inverse cosecant 反餘割

inverse cosine 反餘弦

inverse cotangent 反餘切

inverse function 逆函數, 反函數

inverse mapping 逆映射, 反向映射

inverse matrix 逆矩陣

inverse proportion 反比(例)

inverse relation 逆關係

inverse secant 反正割

inverse sine 反正弦

inverse tangent 反正切
inverse trigonometric function 反三角函數
inverse variation 反變(分), 逆變(分)
invertible 可逆的
invertible matrix 可逆矩陣
irrational number 無理數, 不可比數
irregular 不規則
isosceles triangle 等腰三角形
iterate 迭代
iteration 迭代
iteration form 迭代形
iterative function 迭代函數
iterative method 迭代法
joint variation 聯變(分), 連變(分)
kilogram (kg) 千克, 公斤
kilometre (km) 千米, 公里
kite 鸞形, 鷓形
L'Hospital's rule 洛必達法則
Lagrange interpolating polynomial 拉格朗日插值多項式
Lagrange theorem 拉格朗日定理
last term 末項
latent root 本徵根, 特徵根
lattice point 格點
law of indices 指數(定)律
law of trichotomy 三分律
leading coefficient 首項係數
leading diagonal 主對角線
least common multiple (L.C.M.) 最小公倍數, 最低公倍式
least value 最小值
left-hand limit 左方極限
Leibniz's rule for differentiation 萊布尼茲法則
lemma 引理
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length 長(度)
level of significance 顯著(性)水平
like surds 同類根式

like terms 同類項
limit 極限
limit of sequence 序列的極限, 數列的極限
limiting case 極限情況
limiting position 極限位置
line 線
line of greatest slope 最大傾斜線, 最大斜率的直線
line segment 線段
linear 線性(的), 一次(的)
linear differential equation 線性微分方程(式)
linear equation 線性方程(式), 一次方程(式)
linear equation in two unknowns 二元一次方程(式), 二元線性方程(式)
linear inequality 一次不等式, 線性不等式
linear interpolation 線性插值(法), 線性內插(法)
linear programming 線性規畫
linearly dependent 線性相關(的)
linearly independent 線性無關(的)
literal coefficient 文字係數
literal equation 文字方程(式)
litre (L)(l) 升, 公升
local maximum 局部極大(值)
local minimum 局部極小(值)
locus [loci] 軌跡
logarithm 對數
logarithmic function 對數函數
logic 邏輯
long division method 長除法
lower bound 下界
lower boundary 下邊界
lower limit 下限
lower quartile 下四分位數
lower sum 下和
lower triangular matrix 下三角形矩陣
lowest common multiple (L.C.M.) 最小公倍數, 最低公倍式
Maclaurin expansion,

Maclaurin's expansion	method of successive substitution 逐次代換法
麥克勞林展開式	metre (m) 米，公尺
Maclaurin series, Maclaurin's series 麥克勞林級數	metric system 公制，十進制
magnitude (1)量；(2)數量；(3)長度；(4)大小	midpoint, mid-point 中點
main diagonal 主對角線	millilitre (mL)(ml) 毫升
major arc 優弧，大弧	millimetre (mm) 毫米
major axis 長軸	minimise 極小化
major sector 優扇形，大扇形	minimum point 極小點
major segment 優弓形，大弓形	minimum value 極小值
mantissa of logarithm 對數的尾數，對數的定值部	minor (1)子行列式；(2)劣（的），小（的）
many-sided figure 多邊形	minor arc 劣弧，小弧
many-to-one 多對一（的）	minor axis 短軸
many-valued 多值的	minor of a determinant 子行列式
map into 映入	minor sector 劣扇形，小扇形
map onto 映上	minor segment 劣弓形，小弓形
mapping 映射	minus 減
mathematical analysis 數學分析	minute 分
mathematical induction 數學歸納法	mixed fraction 帶分數
mathematics 數學	mixed number 帶分數
matrix 矩陣	modal class 眾數組
matrix operation 矩陣運算	mode 眾數
maximise 極大化	modelling 建模
maximum point 極大點	modulus 模，模數
maximum value 極大值	monomial 單項式
mean 平均數，平均值，均值	monotone 單調（的）
mean deviation 平均偏差	monotonic convergence 單調收斂
mean value theorem 中值定理	monotonic decreasing 單調遞減（的）
measure (1)度量；(2)測度	monotonic function 單調函數
measurement 量度，測量	monotonic increasing 單調遞增（的）
median (1) 中位數；(2) 中線	multinomial 多項式
meet 相交	multiple (1)倍數；(2)倍式；(3)多重
mensuration 測量法，求積法	multiple angle 倍角
method of completing the square 配方法	multiple root （多）重根
method of elimination (1)消元法；(2)加減（消元）法	multiple-angle formula 倍角公式
method of interpolation 插值法，內插法	multiplicand 被乘數
method of substitution (1)代換法，換元法，置換法；(2)代入（消元）法	multiplication 乘法
	multiplication law 乘法定律
	multiplicative inverse 乘法逆元（素），乘法反元（素）
	multiplicity 重數

multiplier 乘數，乘式
multiply 乘
multi-valued 多值的
mutually disjoint 互不相交（的）
mutually exclusive events 互斥事件，不相容事件
mutually perpendicular lines 互相垂直線
 n factorial n 階乘
Napierian logarithm 納皮爾對數，自然對數
natural logarithm 自然對數
natural number 自然數
necessary and sufficient condition 充要條件，必要且充分的條件
necessary condition 必要條件
negation 否定式
negative 負（的）
negative angle 負角
negative index 負指數
negative integer 負整數
negative number 負數
neighbourhood 鄰域
net (1) 淨（值）；(2) 網（格）；(3) 摺紙圖樣，展開圖
Newton method, Newton's method 牛頓方法
Newton-Raphson method 牛頓-拉弗森方法
 n -gon n 邊形
nonagon 九邊形
non-collinear 不共線（的），非共線（的）
non-commutative 非交換的
non-linear 非線性（的）
non-negative 非負的
non-reflexive 非自反的
non-singular 滿秩的，非奇（異）的
non-singular matrix 滿秩矩陣，非奇異矩陣
non-transitive 非可遞的
non-trivial 非平凡的
non-zero 非零
norm (1) 範（數）；(2) 模方
normal (1) 法線；(2) 垂直的，正交的；(3) 正態的，常態的；(4) 正常的，正規的

normal curve 正態分佈曲線，正態分布曲線，常態分佈曲線，常態分布曲線，正規曲線
normal distribution 正態分佈，正態分布，常態分佈，常態分布
normal form (1) 法線式；(2) 範式，正規形式
normal vector 法向量，法向量
normalise 正規化，常態化
notation 記法，記號
 n th derivative n 階導數
 n th root n 次根
 n th root of unity 單位的 n 次根
null 零（的），空（的）
null hypothesis 原假設，零假設，虛假設
null set 空集，零集
null vector 零向量，零向量
number 數
number line 數線
number pattern 數型
number system 數系
numeral 數字，數碼
numeral system 記數系統
numerator 分子
numerical 數值的，數字的
numerical analysis 數值分析
numerical integration 數值積分（法）
numerical method 數值方法
objective function 目標函數
oblique 斜的
oblique asymptote 斜漸近線
oblique cone 斜圓錐
oblong 長方形（的）
obtuse angle 鈍角
obtuse triangle 鈍角三角形
octagon 八邊形
octahedron 八面體
octal number 八進制數，八進位數
octant 卦限
odd function 奇函數
odd number 奇數，單數

one-one correspondence 一一對應	parallelogram 平行四邊形
one-one mapping 一一映射	parallelogram law of addition 平行四邊形加法
one-tailed test 單尾檢驗(法), 單側檢驗(法)	parallelogram method 平行四邊形法
one-to-many 一對多(的)	parameter 參數, 參變量
one-to-one 一對一(的)	parametric equation 參數方程(式)
only if 僅當	parametric form 參數式
onto mapping 滿射	partial fraction 部分分式, 部分分數
open interval 開區間	partial sum 部分和
open sentence 開(放)(語)句	partial variation 部分變(分)
operation 運算	particular solution 特解
opposite angle 對角	partition 分割, 劃分
opposite interior angle 內對角	Pascal's triangle 帕斯卡三角形, 巴斯卡三角形
optimal solution 最優解	pattern 規律, 模型
order (1) 次; (2) (次) 序; (3) 階, 級; (4) 重, 折	pegboard 有孔板
order of a matrix 矩陣的階	pencil of lines 線束
ordered n -tuples 有序 n 元(組)	pentagon 五邊形
ordered pair 序偶, 序對	percent 百分率, 百分數, 百分比
ordered relation 有序關係	percentage 百分法, 百分數
ordered set 有序集	percentage error 百分誤差
ordered triples 有序三元(組)	percentage point 百分(比)點
ordinary differential equation 常微分方程(式)	percentile 百分位數(值)
ordinate 縱坐標	perfect number 完全數
origin 原點	perfect square 完全平方
orthocentre 垂心	perimeter 周界, 周長
orthogonal 正交(的)	period 週期
orthogonal circles 正交圓	periodic function 週期函數
orthogonal projection 正(交)投影	permutation 排列
orthogonality 正交性	permutation with repetition 有重排列
outcome 結果	permutation without repetition 無重排列
P P	perpendicular (1) 垂線; (2) 垂直(於)
pairwise disjoint 兩兩不相交(的)	perpendicular bisector 垂直平分線, 中垂線
pairwise mutually exclusive events 兩兩互斥事件	perpendicular line 垂(直)線
parabola 拋物線	pictogram 象形圖
paradox 悖論	pie chart 圓形圖, 圓瓣圖
parallel 平行(的)	pinboard 釘板
parallel lines 平行線	place value 位值
parallelepiped 平行六面體	plan 平面圖
	plane 平面

plane figure 平面圖形	principal angle 主角
Platonic Solid 柏拉圖立體	principal axis 主軸
plot 作... .. (圖)	principal value 主值
plus 加	principal value interval 主值區間
point 點	principle of mathematical induction 數學歸納法原理
point circle 點圓	principle of superposition 疊合原理，重疊原理
point estimation 點估計	prior probability 先驗概率，事先概率
point of contact 切(觸)點	prism 稜柱(體)，棱柱(體)，角柱(體)
point of division 分點	prismoid 平截頭稜錐體，平截頭棱錐體
point of inflection 拐點，反曲點	probability 概率，或然率，機率
point of inflexion 拐點，反曲點	probability density function 概率密度函數
point of intersection 交點	probability distribution 概率分佈，概率分布
point-slope form 點斜式	probability generating function 概率母函數
Poisson distribution 泊松分佈，泊松分布，卜瓦松分佈，卜瓦松分布	problem 應用題
polar coordinates 極坐標	produce 延長
polar equation 極方程(式)	product 積，乘積
polar form 極形式	product and sum formula 和積互變公式
polygon 多邊形	product rule 積法則
polygon law of addition 多邊形加法	product sample space 積樣本空間
polygon method 多邊形法	product set 積集
polyhedron [polyhedra] 多面體	product to sum formula 積化和差公式
polynomial 多項式	progression (1)數列；(2)級數
polynomial equation 多項式方程(式)	projecting lines 投影線，投映線
population 總體，母體	projecting plane 投影平面，投映平面
population mean 總體平均(值)	projection 投影，投映，射影，射映
position vector 位置向量，位置矢量	proof 證(明)
positive 正	proof by contradiction 反證法，歸謬法
positive index 正指數	proof by contrapositive 反證法
positive integer 正整數	proper fraction 真分數
positive number 正數	proper integral 正常積分
posterior probability 後驗概率	proper subset 真子集
postulate 公設	property 性質
power (1) 冪，乘方；(2) 檢定力	proportion 比例
power function 冪函數	proportional 成比例的
power series 冪級數	proposition 命題
power set 冪集，勢集	propositional calculus 命題演算
precision 精確度	propositional inference 命題推演
prime number 質數，素數	protractor 量角器
primitive function 原函數	

prove 證(明)	rational index 有理(數)指數
Ptolemy Theorem, Ptolemy's Theorem 托勒密定理	rational number 有理數, 可比數
purely imaginary number 純虛數	rationalisation 有理化
pyramid 稜錐(體), 棱錐(體), 角錐(體)	raw data 原始數據
Pythagoras' theorem, Pythagorean theorem 畢達哥拉斯定理, 畢氏定理	raw score 原始分(數)
Pythagorean triplet 畢達哥拉斯三元數組, 畢氏三元數組	real axis 實軸
quadrant 象限	real number 實數
quadratic equation 二次方程(式)	real part 實部
quadratic function 二次函數	real root 實根
quadratic inequality 二次不等式	reciprocal (1)倒數(的); (2)互反(的), 互逆(的)
quadrilateral 四邊形	rectangle 矩形, 長方形
quantifier 量詞	rectangular coordinates 直角坐標
quartic equation 四次方程(式)	rectangular distribution 矩形分佈, 矩形分布
quartile 四分位數	rectangular formula 矩形公式
quintic equation 五次方程(式)	rectangular hyperbola 等軸雙曲線, 直角雙曲線
quotient 商(式)	rectangular number 矩形數
quotient rule 商法則	rectangular prism 矩形稜柱(體), 矩形棱柱(體)
radial component 徑向分量	rectilinear figure 直線圖形
radian 弧度	recurrence formula 遞推公式
radian measure 弧度法	recurrent 循環的, 遞歸的
radical 根, 根式, 根號	recurring decimal 循環小數
radical axis 根軸, 等冪軸	reduce 簡化
radical centre 根心, 等冪心	reducibility 可約性, 可化簡性
radius [radii] 半徑	reducible 可約的, 可化簡的
random 隨機(的)	reductio ad absurdum 反證法, 歸謬法
random experiment 隨機試驗	reduction formula 歸約公式
random number 隨機數	reflection 反射, 鏡射
random sample 隨機樣本	reflex angle 優角, 反角
random variable 隨機變量	reflexive 自反的
range (1)值域; (2)區域, 範圍; (3)極差, 分佈域, 分布域	reflexive relation 自反關係
rank 秩	region 區域
rate (比)率	region of acceptance 接受區域, 接收區域
rate of change 變(化)率	region of rejection 否定區域
ratio 比(率)	regular cone 正則錐(體)
rational expression 有理式, 有理表達式	regular polygon 正多邊形
rational function 有理函數	regular polyhedron [polyhedra] 正多面體
	regular prism 正稜柱(體), 正棱柱(體)

regular pyramid 正稜錐(體), 正稜錐(體)	樣本分佈, 樣本分布
relation 關係(式)	sampling technique 抽樣技術
relative error 相對誤差	sampling theory 抽樣(理)論
relative frequency 相對頻數	sandwich theorem 迫近定理
relative maximum 相對極大	scalar 純量(的), 無向量(的), 標量(的)
relative minimum 相對極小	scalar matrix 純量矩陣, 標量矩陣
relatively prime 互質, 互素	scalar multiplication 純量乘法, 標量乘法
reliability (可)信度	scalar product 純量積, 點積
remainder 餘數, 餘式	scalar triple product 純量三重積
remainder term 餘項	scale 比例尺, 標度, 圖尺, 尺度
remainder theorem 餘式定理	scalene triangle 不等邊三角形, 不規則三角形
repeated trials 重複試驗	scatter diagram 散點圖, 散佈圖, 散布圖
resolution of vector 向量分解, 矢量分解	scientific notation 科學記數法
resultant vector 合(成)向量, 合(成)矢量	secant (1) 正割; (2) 割線
rhombus 菱形	secant method 割線法, 正割法
right angle 直角	second (s) 秒
right circular cone 直(立)圓錐(體)	second derivative 二階導數, 二次導數
right circular cylinder 直(立)圓柱(體)	second order ordinary differential equation 二階常微分方程(式)
right prism 直(立)稜柱(體), 直(立)稜柱(體)	second quadrant 第二象限
right pyramid 直(立)稜錐(體), 直(立)稜錐(體)	second quartile 第二四分位數
right-angled triangle 直角三角形	section (1) 截面; (2) 截線; (3) 截點
right-hand limit 右方極限	section formula 截點公式
Rolle theorem, Rolle's theorem 洛爾定理, 羅爾定理	sector 扇形
root 根	segment of a circle 弓形
root-mean-square 均方根	semicircle 半圓
rotation 旋轉	semi-conjugate axis 半共軛軸
round down 下捨入, 不進位捨入	semi-major axis 半主軸, 半長軸
round off 捨入, 四捨五入	semi-minor axis 半副軸, 半短軸
round up 上捨入, 進位捨入	semi-regular polyhedron 半正多面體
row 行	semi-transverse axis 半貫軸
row vector 行向量, 行矢量	semi-vertical angle 半頂角
ruler 直尺	sentence 句, 語句
sample 樣本	sequence 數列, 序列
sample mean 樣本平均數, 樣本均值	series 級數
sample space 樣本空間	set 集(合)
sampling distribution 抽樣分佈, 抽樣分布,	set square 三角尺, 三角板
	sexagesimal number 六十進制數, 六十進位數

shape 形狀	solution set 解集 (合)
shear 剪 (切), 剪力	solve 解
shell method 外殼法	Soma Cube 索馬立體
SI, Le Syst ^{ème} international d'unit ^{és} 國際單位制	sound argument 真確論證
side 邊, 側	span 生成
sign (1)符號, 記號; (2)正負號	special angle 特殊角, 特別角
significance level 顯著性水平	sphere (1)球形; (2)球面
significant digit 有效位	spheroid (1)球體; (2)橢圓體, 迴轉橢圓體
significant figure 有效數字	
signum 正負號函數	spiral 螺線
similar figures 相似圖形	square (1)平方, 二次冪; (2)正方形
similar triangles 相似三角形	square matrix 方 (矩) 陣
similarity 相似 (性)	square number 正方形數, 平方數
simple equation 簡易方程 (式)	square root 平方根, 二次根
simple iteration method 簡單迭代法	squeeze theorem 迫近定理
simplify 簡化	standard deviation 標準差
Simpson integral, Simpson's integral 森遜積分, 辛普森積分	standard equation 標準方程 (式)
Simpson rule, Simpson's rule 森遜法則, 辛普森法則	standard error 標準誤差
simultaneous equations 聯立方程 (式)	standard form 標準式, 標準型
simultaneous inequalities 聯立不等式	standard normal distribution 標準正態分佈, 標準正態分布, 標準常態分佈, 標準常態分布
sine 正弦	standard score 標準分
sine formula 正弦公式	standard unit 標準單位
singleton 單元集	statement 陳述, 述句, 語句
single-valued function 單值函數	stationary point 平穩點, 駐點
singular 奇 (異) 的	stationary value 平穩值
singular matrix 降秩矩陣, 奇異矩陣	statistic 統計量
skew distribution 偏斜分佈, 偏斜分布	statistical analysis 統計分析
slant edge 斜稜, 斜棱	statistical chart 統計圖表
slant height 斜高	statistical data 統計數據
slide rule 計算尺	statistical significance 統計顯著性
slope 斜率, 斜度, 傾斜, 坡度	statistical test 統計檢驗, 統計試驗
slope-intercept form 斜率截距式, 斜截式	statistics (1)統計 (學); (2)統計量
solid (1)立體; (2)固體	stem-and-leaf diagram 幹葉圖, 莖葉圖
solid of revolution 旋轉體, 迴旋體	step function 階梯函數
solution 解, 解法	straight line 直線
solution of equation 方程 (式) 解	straight line graph 直線圖像
solution of triangle 解三角形, 三角形解法	strictly monotonic 嚴格單調
	strictly monotonic function 嚴格單調函數

subject 主項	system of numerals 記數系統
submultiple angle formula 半角公式	system of straight lines 直線系
subnormal 次法線	table 表
subsequence 子序列，子數列	tabulate 製表
subset 子集	tabulation form 表列式
subsidiary angle 輔助角	tabulation method 列表法
substitute 代入，代換	tail (1) (錢幣的) 反面；(2) 尾部
subtend 對向	tangent (1) 正切；(2) 切線 (的)
subtract 減	tautology 恆真命題，恆真式
subtraction 減法	Taylor expansion, Taylor's expansion 泰勒展開式
successive approximation 逐次逼近，逐次近似	Taylor series, Taylor's series 泰勒級數
successive derivative 逐次導數，逐次微商	Taylor theorem, Taylor's theorem 泰勒定理
successive differentiation 逐次微分 (法)	term 項
sufficiency 充分性	terminal point 終點
sufficient and necessary condition 充要條件	terminal side 終邊
sufficient condition 充分條件	terminating decimal 有盡小數
sum 和，總數	tessellation 密鋪，鋪嵌，嵌圖
sum to infinity 無限項之和	test 檢驗，試驗，測驗，檢定
sum to n terms n 項和	test criterion 檢驗標準
sum to product formula 和化積公式	test of significance 顯著性檢驗
summation 求和 (法)，總和	tetrahedron 四面體
summation formula 求和公式，總和公式	theorem 定理
superimposing 疊和，疊合	theoretical probability 理論概率
supplementary angle 補角	theory (理) 論
surd 根式，不盡根	third quadrant 第三象限
surface 面，表面，曲面	third quartile 第三四分位數
surface area 表面面積，曲面面積	three-dimensional space 三維空間
surface of revolution 旋轉曲面，迴轉曲面	torus 環面
surjection 滿射	total probability 總概率，全概率
surjective function 滿射函數，映成函數	touch 切 (觸)
syllogism 三段論	trace 跡
symbol 符號，記號	transcendental function 超越函數
symmetric difference 對稱差	transcendental number 超越數
symmetric expression 對稱式	transform 變換，轉換
symmetric relation 對稱關係	transformation 變換，轉換
symmetry 對稱 (性)	transitive 可 (傳) 遞的，可遞的
synthetic division 綜合除法	transitive law 可遞律
system (1) 系統，體系；(2) 組，系	transitive property 傳遞性
system of circles 圓系	transitivity 傳遞性

translation 平移	two-point form 兩點式
transpose (1)移項；(2)轉置	two-tailed test 雙尾檢驗，雙端檢驗
transpose of matrix 倒置矩陣，轉置矩陣	type I error 第一型誤差，第一類誤差
transversal 截線，橫截的	type II error 第二型誤差，第二類誤差
transverse axis 貫軸，橫截軸	unary operation 一元運算
transverse component 橫截分量	unbiased estimator 無偏估計量，不偏估計量
trapezium 梯形	unbounded function 無界函數
trapezoidal integral 梯形積分	undefined 未定義（的）
trapezoidal rule 梯形法則	undetermined coefficient 待定係數
travel graph 行程圖	unequal 不等
tree diagram 樹形圖	ungrouped data 未分組數據，不分組數據
trial 試，試驗	uniform (1)一致（的）；(2)均勻（的）
triangle 三角形	uniform cross-section 均勻橫切面
triangle inequality 三角不等式	uniform distribution 均勻分佈，均勻分布
triangle law of addition 三角形加法	unimodal distribution 單峰分佈，單峰分布
triangle method 三角形法	union 併集，和集
triangular matrix 三角（形）矩陣	unique 唯一（的）
triangular number 三角形數	unique solution 唯一解
triangular prism 三稜柱（體），三棱柱（體），三角柱（體）	uniqueness 唯一性
trichotomy law 三分律	unit 單位
trigonometric equation 三角方程（式）	unit area 單位面積
trigonometric function 三角函數，圓函數	unit circle 單位圓
trigonometric identity 三角恆等式	unit imaginary number 單位虛數
trigonometric ratio 三角比	unit matrix 單位矩陣
trigonometric table 三角函數表	unit vector 單位向量，單位矢量
trigonometry 三角學	unit volume 單位體積
trinomial 三項式	universal quantifier 全稱量詞
triple (1)三倍（的）；(2)三元組	universal set 全集，宇集，泛集
triple angle 三倍角	unknown 未知數，未知量
triple product 三重積	unlike terms 異類項
trisect 三等分	upper bound 上界
trivial solution 平凡解	upper boundary 上邊界
true 真（的）	upper limit 上限
truncation error 截斷誤差，截尾誤差，捨位誤差	upper quartile 上四分位數
truth table 真（假）值表	upper sum 上和
truth value 真（假）值	upper triangular matrix 上三角形矩陣
turning point 轉向點	valid argument 對確論證
two-dimensional space 二維空間	validity (1)（有）效度；(2)對確性
	value 值
	variability 可變性，變異性

variable 變量，元，變元，變數
variance 方差，變異數
variation 變數，變分
vector 向量，矢量
vector product 向量積，矢量積，叉積
vector space 向量空間
vector triple product 向量三重積
Venn diagram 溫氏圖，范氏圖，文氏圖，維恩圖
verification 檢驗，驗證
verify 檢驗，驗證
vertex [vertices] 頂（點）
vertical 垂直（的），鉛垂（的）
vertical angle 頂角
vertical asymptote 垂直漸近線
vertical component 垂直分量
vertically opposite angles 對頂角
volume 體積
volume of revolution 旋轉體的體積，迴轉體的體積
weighted average 加權平均數，加權平均值
weighted mean 加權平均數，加權平均值
whole number 整數
width 闊（度），寬（度）
without loss of generality 不失一般性，不失普遍性
 x -axis x 軸
 x -coordinate x 坐標
 x -intercept x 軸截距
Yang Hui triangle 楊輝三角（形）
 y -axis y 軸
 y -coordinate y 坐標
 y -intercept y 軸截距
zero (1) 零；(2) 零點
zero matrix 零矩陣
zero vector 零向量，零矢量