Chapter 1 Introduction

This chapter provides the background, rationale and aims of Mathematics as a core subject in the three-year senior secondary curriculum, and highlights how it articulates with the junior secondary curriculum, post-secondary education and future career pathways.

1.1 Background

This Guide has been prepared by the Curriculum and Development Council (CDC) – Hong Kong Examinations and Assessment Authority (HKEAA) Committee on Mathematics Education (Senior Secondary) in support of the new three-year senior secondary curriculum recommended in the report on the new academic structure published in May 2005. Mathematics is a core subject for students from the primary level to the junior secondary level. In the senior secondary curriculum, Mathematics is also one of the core subjects.

The Mathematics Curriculum (S4 – 6) is a continuation of the existing Mathematics Curriculum at the junior secondary level. Its development is built on the direction set out in the *Mathematics Education Key Learning Area Curriculum Guide (Primary 1 – Secondary 3)*. Students' knowledge, skills, positive values and attitudes are further extended.

This document presents an outline of the overall aims, learning targets and objectives of the subject for the senior secondary level. It also provides suggestions regarding curriculum planning, learning and teaching strategies, assessment practices and resources. Schools are encouraged to adopt the recommendations in this Guide, taking into account their context, needs and strengths.

1.2 Rationale

The rationale for studying Mathematics as a core subject at the senior secondary level is presented below:

- Mathematics is a powerful means in a technology-oriented and information-rich society to help students acquire the ability to communicate, explore, conjecture, reason logically and solve problems using a variety of methods.

- Mathematics provides a means to acquire, organise and apply information, and plays an important role in communicating ideas through pictorial, graphical, symbolic, descriptive and analytical representations. Hence, mathematics at the senior secondary level helps to lay a strong foundation for students' lifelong learning, and provides a platform for the acquisition of new knowledge in this rapidly changing world.

- Many of the developments, plans and decisions made in modern society rely, to some extent, on the use of measures, structures, patterns, shapes and the analysis of quantitative information. Therefore, mathematical experiences acquired at the senior secondary level enable students to become mathematically literate citizens who are more able to cope with the demands of the workplace.

- Mathematics is a tool to help students enhance their understanding of the world. It provides a foundation for the study of other disciplines in the senior secondary and post-secondary education system.

- Mathematics is an intellectual endeavour through which students can develop their imagination, initiative, creativity and flexibility of mind, as well as their ability to appreciate the beauty of nature. Mathematics is a discipline which plays a central role in human culture.

1.3 Curriculum Aims

Overall Aims

The overall curriculum aims of the Mathematics Education Key Learning Area are to develop in students:

(a) the ability to think critically and creatively, to conceptualise, inquire and reason mathematically, and to use mathematics to formulate and solve problems in daily life as well as in mathematical contexts and other disciplines;

(b) the ability to communicate with others and express their views clearly and logically in mathematical language;

(c) the ability to manipulate numbers, symbols and other mathematical objects;

(d) number sense, symbol sense, spatial sense, measurement sense and the capacity to appreciate structures and patterns;

(e) a positive attitude towards mathematics learning and an appreciation of the aesthetic nature and cultural aspects of mathematics.

1.4 Interface with the Junior Secondary Curriculum and Post-secondary Pathways

1.4.1 Interface with the Junior Secondary Mathematics Curriculum

The Mathematics Curriculum (S4 – 6), as part of the secondary curriculum, is built on the direction for development set out in the *Mathematics Education Key Learning Area Curriculum Guide (Primary 1 – Secondary 3).* It aims at helping students to consolidate what they have learnt through basic education, broadening and deepening their learning experiences, as well as further enhancing their positive values and attitudes towards mathematics learning. To ensure a seamless transition between the junior and senior secondary levels, a coherent curriculum framework is designed for mathematics education at both levels.

As at the junior secondary level, the mathematics curriculum at the senior secondary level aims to meet the challenges of the 21st century by developing students' ability to think critically and creatively, to inquire and reason mathematically, and to use mathematics to formulate and solve problems in daily life as well as in mathematical contexts.

A particular learning unit "Inquiry and Investigation" has been included to provide students with opportunities to improve their ability to inquire, communicate, reason and conceptualise mathematical concepts; and there is also a "Further Applications" learning unit in which they have to integrate various parts of mathematics which they have learnt, and thus recognise the inter-relationships between their experiences of concrete objects in junior forms and abstract notions in senior forms.

1.4.2 Interface with Post-secondary Pathways

The curriculum also aims to prepare students for a range of post-secondary pathways, including tertiary education, vocational training and employment. It consists of a Compulsory Part and an Extended Part. In order to broaden students' choices for further study and work,

two modules in the Extended Part are provided to further develop their knowledge of mathematics. These two modules are designed to cater for students who intend to:

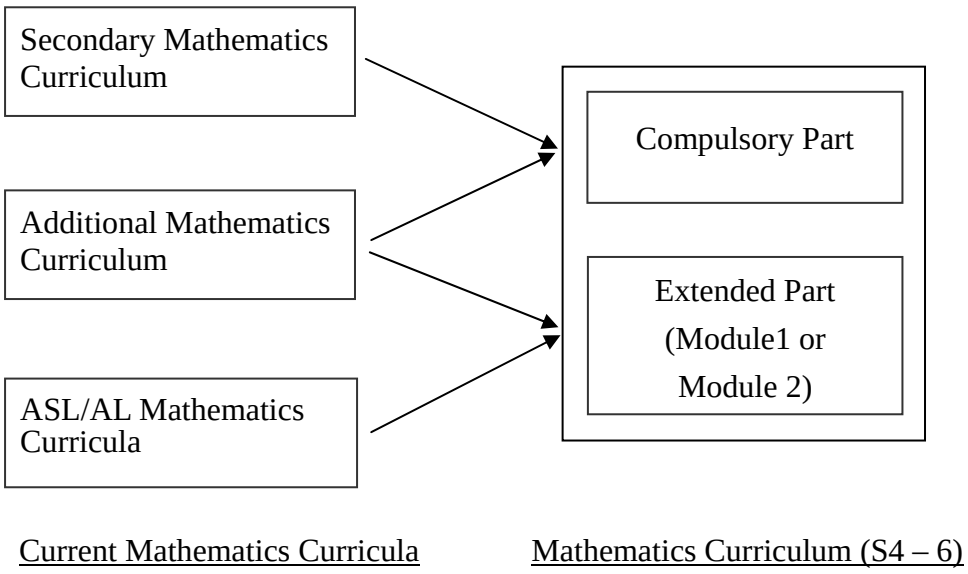
- pursue further studies which require more mathematics; or
- follow a career in fields such as natural sciences, computer sciences, technology or engineering.

Module 1 (Calculus and Statistics) focuses on statistics and the application of mathematics, and is designed for students who will be involved in study and work which demand a wider knowledge and deeper understanding of the application of mathematics, in particular, statistics.

Module 2 (Algebra and Calculus) focuses on mathematics in depth and aims to cater for students who will be involved in a mathematics-related discipline or career.

The students' performances in the public examination in the Compulsory Part, Module 1 and Module 2 will be separately reported for the reference of different users.

The following illustration gives an indication of the migration of the current Mathematics Curricula towards the Mathematics Curriculum (S4 – 6).



The Mathematics Curriculum (S4 – 6) supports students' needs in numerous vocational areas and careers, by providing them with various learning pathways. Further details will be provided in Chapter 2.