IB Mathematics HL Syllabus for Year 1 and Year 2

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I. Mathematics HL – course details

The course focuses on developing important mathematical concepts in a comprehensible, coherent and rigorous way. This is achieved by means of a carefully balanced approach. Students are encouraged to apply their mathematical knowledge to solve problems set in a variety of meaningful contexts. Development of each topic should feature justification and proof of results. Students embarking on this course should expect to develop insight into mathematical form and structure, and should be intellectually equipped to appreciate the links between concepts in different topic areas. They should also be encouraged to develop the skills needed to continue their mathematical growth in other learning environments.

The internally assessed component, the exploration, offers students the opportunity for developing independence in their mathematical learning. Students are encouraged to take a considered approach to various mathematical activities and to explore different mathematical ideas. The exploration also allows students to work without the time constraints of a written examination and to develop the skills they need for communicating mathematical ideas.

Source: International Baccalaureate Organization – HL Math Guide first examinations 2014

II. Resources Needed

- Textbook
- Graphic Display Calculator: (Texas Instruments TI-84 Plus)
- Compass, protractor, ruler, and paper as necessary – you are allowed to have these items when sitting for the Papers in May 2017

III. Prior Learning

Students should have a good understanding of topics covered in courses leading up to the DP program: This includes: algebra, trigonometry, geometry, coordinate geometry, statistics and probability.

IV. Assessment

Students will be challenged throughout the year and will be marked in accordance with the IB Grading Scheme. Tests and quizzes will be made up of multiple choice and free response Problems(mostly), which will be marked in accordance with the IB marking scheme. All quizzes and tests will be cumulative and at times, parts or all of the assessment will be done without the use of a calculator. The reason for this is that on Paper 1 no calculator is allowed and on Paper 2 & 3 the use of a calculator is required.

There will be some type of assessment every week at minimum. Doing all of the homework carefully and thoroughly is extremely important to doing well on the exam. Often, there will be required reading on the next day's topic.

40% Tests
30% Quizzes
5% Lesson Quizzes
10% Investigations
10% HW
5% Participation/Effort

Grade Scale

Score	Mark
78.0 % or greater	7
67.0 % or greater	6
56.0 % or greater	5
44.0 % or greater	4
31.0 % or greater	3
16.0 % or greater	2
0.0 % or greater	1

V. Assessment Objectives from the IB Guide

Problem-solving is central to learning mathematics and involves the acquisition of mathematical skills and concepts in a wide range of situations, including non-routine, open-ended and real-world problems. Having followed a DP mathematics SL course, students will be expected to demonstrate the following.

1. Knowledge and understanding: recall, select and use their knowledge of mathematical facts, concepts and techniques in a variety of familiar and unfamiliar contexts.

2. Problem-solving: recall, select and use their knowledge of mathematical skills, results and models in both real and abstract contexts to solve problems.

3. Communication and interpretation: transform common realistic contexts into mathematics; comment on the context; sketch or draw mathematical diagrams, graphs or constructions both on paper and using technology; record methods, solutions and conclusions using standardized

4. Technology: use technology, accurately, appropriately and efficiently both to explore new ideas and to solve problems.

5. Reasoning: construct mathematical arguments through use of precise statements, logical deduction and inference, and by the manipulation of mathematical expressions.

6. Inquiry approaches: investigate unfamiliar situations, both abstract and real-world, involving organizing and analyzing information, making conjectures, drawing conclusions and testing

Source: International Baccalaureate Organization - Mathematics SL guide - First exams 2014

VI. Curriculum Outline (See link on www.mranselm.com)

VII. Mathematics and theory of knowledge

The Theory of knowledge guide (March 2006) identifies four ways of knowing, and it could be claimed that these all have some role in the acquisition of mathematical knowledge. While perhaps initially inspired by data from sense perception, mathematics is dominated by reason, and some mathematicians argue that their subject is a language, that it is, in some sense, universal. However, there is also no doubt that mathematicians perceive beauty in mathematics, and that emotion can be a strong driver in the search for mathematical knowledge.

As an area of knowledge, mathematics seems to supply a certainty perhaps missing in other disciplines. This may be related to the “purity” of the subject that makes it sometimes seem divorced from reality. However, mathematics has also provided important knowledge about the

world, and the use of mathematics in science and technology has been one of the driving forces for scientific advances.

Despite all its undoubted power for understanding and change, mathematics is in the end a puzzling phenomenon. A fundamental question for all knowers is whether mathematical knowledge really exists independently of our thinking about it. Is it there "waiting to be discovered" or is it a human creation?

Students' attention should be drawn to questions relating theory of knowledge (TOK) and mathematics, and they should be encouraged to raise such questions themselves, in mathematics and TOK classes. This includes questioning all the claims made above. Examples of issues relating to TOK are given in the "Links" column of the syllabus. Teachers could also discuss questions such as those raised in the "Areas of knowledge" section of the TOK guide.

Source: International Baccalaureate Organization Mathematics HL Guide

VIII. Group 5 Aims

The aims of all mathematics courses in group 5 are to enable students to:

1. enjoy mathematics, and develop an appreciation of the elegance and power of mathematics
2. develop an understanding of the principles and nature of mathematics
3. communicate clearly and confidently in a variety of contexts
4. develop logical, critical and creative thinking, and patience and persistence in problem-solving
5. employ and refine their powers of abstraction and generalization
6. apply and transfer skills to alternative situations, to other areas of knowledge and to future
7. appreciate how developments in technology and mathematics have influenced each other
8. appreciate the moral, social and ethical implications arising from the work of mathematicians and the applications of mathematics
9. appreciate the international dimension in mathematics through an awareness of the universality of mathematics and its multicultural and historical perspectives
10. appreciate the contribution of mathematics to other disciplines, and as a particular "area of knowledge" in the TOK course.

IX. Contact Information

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