



Enseignement secondaire	
Classes internationales	
Régime anglophone	
Mathématiques	
Programme	
5IEC	

Leçons hebdomadaires: 4
Langue véhiculaire: anglais
Nombre minimal de devoirs en classe: 7 par année / 2 par trimestre

General comments

Students are expected to be familiar with the mathematical skills required for the admission to year 9 (5IEC). The aim of the course is to prepare for the study of mathematics in year 10 (4IEC).

Numerical and algebraic reasoning

The ability to work with numbers and symbols is an essential skill in mathematics. Students are expected to have an understanding of number concepts and to develop the skills of calculation and approximation. Algebra uses letters and symbols to represent numbers, quantities and operations, and employs variables to solve mathematical problems. Algebra is an abstraction of the concepts first used when dealing with numbers and is essential for further learning in mathematics.

Algebra: Expressions	Chapter 2
Review from year 8: <ul style="list-style-type: none">- Algebraic notation- Writing expressions- Algebraic substitution- The language of algebra- Collecting like terms- Algebraic products- Algebraic quotients- Algebraic common factors	
Notes: <ul style="list-style-type: none">- Add exercises in which algebraic sums and products are mixed (similar to Exercise 2F 3), including distributivity and FOIL rules.	
Exponents	Chapter 3
<ul style="list-style-type: none">- Exponent laws- Zero and negative exponents- Standard form (scientific notation)	



Notes: <ul style="list-style-type: none">- Rational indices are treated in year 10- Add more complex exercises in which all different index laws are mixed (some for which the bases are variables, some for which the bases are integers) and alternate between negative and positive bases	
Algebra: Expansion	Chapter 4
Review from year 8: <ul style="list-style-type: none">- The distributive law- The product $(a + b)(c + d)$- The difference between two squares- The perfect squares expansion- Further expansion Notes: <ul style="list-style-type: none">- Add Pascal's triangle- Additional exercises to be added by the teacher (mixing all expansion methods, including fractions)	
Sets	Chapter 5
<ul style="list-style-type: none">- Sets- Complement of a set- Intersection and union- Special number sets- Interval notation	
Venn diagrams	Chapter 7
<ul style="list-style-type: none">- Venn diagrams- Venn diagram regions- Problem solving with Venn diagrams Notes: <ul style="list-style-type: none">- Additional exercises to be added by the teacher (especially on problem solving)	
Surds and other radicals	Chapter 8
<ul style="list-style-type: none">- Square roots- Properties of radicals- Simplest surd form- Operations with radicals- Division with surds Notes: <ul style="list-style-type: none">- Add multiplication by conjugate (i.e. to rationalise fractions of the form $\frac{a}{b \pm \sqrt{c}}$)- Cube and higher roots is done in 4IEC- Power equations will be solved after difference of two squares factorisation is seen	



Algebra: Factorisation	Chapter 14
<ul style="list-style-type: none">- Common factors- Difference between two squares factorisation- Perfect square factorisation- Factorising $x^2 + bx + c$- Miscellaneous factorisation- Expressions with four terms- Factorising $ax^2 + bx + c, a \neq 0$ <p>Notes:</p> <ul style="list-style-type: none">- Additional exercises to be added by the teacher	
Algebraic fractions	Chapter 15
<ul style="list-style-type: none">- Evaluating algebraic fractions- Simplifying algebraic fractions- Multiplying algebraic fractions- Dividing algebraic fractions- Adding and subtracting algebraic fractions <p>Notes:</p> <ul style="list-style-type: none">- Necessary conditions to be added- Additional exercises to be added by the teacher	
Quadratic equations	Chapter 20
<ul style="list-style-type: none">- Quadratic equations- Equations of the form $x^2 = k$- The null factor law- Solving by factorisation- Problem solving- Completing the square <p>Notes:</p> <ul style="list-style-type: none">- Additional exercises to be added by the teacher	

Spatial reasoning

Spatial reasoning skills provide students with the tools for analysing, measuring and transforming geometric quantities in two dimensions.

The topics and skills in spatial reasoning will help students develop an understanding of

- construction and manual skills,
- visualization of 2D shapes
- transformation of shapes

Pythagoras' theorem	Chapter 9
<ul style="list-style-type: none">- Pythagoras' theorem- Pythagorean triples	



- Problem Solving	
Transformation geometry	Chapter 19
- Translations - Reflections - Rotations - Enlargements and reductions - Stretches - Combinations of transformations	

Reasoning with data

This branch of mathematics is concerned with the collection, analysis and interpretation of quantitative data and uses the theory of probability to estimate parameters, discover empirical laws, test hypotheses and predict the occurrence of events.

Through the study of statistics, students should develop skills associated with the collection, organization and analysis of data, enabling them to present information clearly and to discover patterns. Students will also develop critical-thinking skills, enabling them to differentiate between what happens in theory (probability) and what is observed (statistics).

Students should understand both the power and limitations of statistics, becoming aware of their legitimate use in supporting and questioning hypotheses, but also recognizing how statistics can be used to mislead as well as to counter opinions and propaganda.

Probability	Chapter 26
- Sample space and events - Theoretical probability - Probabilities from Venn diagrams - Independent events - Dependent events - Probabilities from tree diagrams - Experimental probability - Probabilities from tabled data - Expectation	

Effective use of information and communication technology in mathematics

The appropriate use of computers, computer applications and calculators can improve the understanding of all students. In year 9, students are expected to write their first *mathematical investigation*.

A mathematical investigation is a short report written by the student. The emphasis is on mathematical communication (including formulae, diagrams, graphs and so on), with accompanying commentary, good mathematical writing and thoughtful reflection. A student should develop his or her own focus, with the teacher providing feedback. This will allow the students to develop an area



of interest for them, without a time constraint as in an examination, and will allow all to experience a feeling of success.

In addition to testing the objectives of the course, the mathematical investigation is intended to provide students with opportunities to increase their understanding of mathematical concepts and processes, and to develop a wider appreciation of mathematics.

It is intended that, by working on the mathematical investigation, students benefit from the mathematical activities undertaken and find them both stimulating and rewarding. It will enable students to acquire the attributes of the IB learner profile.

One of the objectives is to use technology accurately, appropriately and efficiently both to explore new ideas and to solve problems.

Examples include:

- Any kind of calculators, the internet, data logging devices
- Word processing packages, spreadsheets, graphics packages

The paper will be written in Microsoft Word possibly using spreadsheet functions from Microsoft Excel and/or the use of GeoGebra.

In year 9 students write one *mathematical investigation*.

Textbook

Haese and Harris Publications

Mathematics for the international student 9 (MYP 4) – Third edition

ISBN 978-1-922416-34-6

Planning the curriculum

Here's a possible order to sequence the individual chapters.

1. MYP 4 – Chapter 2 – Algebra: Expressions
2. MYP 4 – Chapter 3 – Exponents
3. MYP 4 – Chapter 4 – Algebra: Expansion
4. MYP 4 – Chapter 5 – Sets
5. MYP 4 – Chapter 7 – Venn diagrams
6. MYP 4 – Chapter 8 – Surds and other radicals
7. MYP 4 – Chapter 14 – Algebra: Factorisation
8. MYP 4 – Chapter 20 – Quadratic equations
9. MYP 4 – Chapter 9 – Pythagoras' theorem
10. MYP 4 – Chapter 15 – Algebraic fractions + necessary conditions
11. MYP 4 – Chapter 26 – Probability
12. MYP 4 – Chapter 19 – Transformation geometry

Calculator

Casio FX-991 EX