



PORT MOODY
SECONDARY
SCHOOL

A Tradition of Excellence

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Pre-Diploma Math 10 Course Outline

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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 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 notation, use appropriate notation and terminology.
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 their validity.

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

1. Develop a curiosity and enjoyment of mathematics, and appreciate its elegance and power
2. develop an understanding of the concepts, principles and nature of mathematics
3. communicate clearly, concisely and confidently in a variety of contexts
4. develop logical and creative thinking, and patience and persistence in problem solving to instill confidence in using mathematics
5. employ and refine their powers of abstraction and generalization
6. take action to apply and transfer skills to alternative situations, to other areas of knowledge and to future developments in their local and global communities appreciate how developments in technology and mathematics have influenced each other

7. appreciate how developments in technology and mathematics influence each other appreciate the international dimension in mathematics through an awareness of the universality of mathematics and its multicultural and historical perspectives
8. appreciate the moral, social and ethical questions arising from the work of mathematicians and the applications of mathematics
9. appreciate the universality of mathematics and its multicultural, international and historical perspectives
10. appreciate the contribution of mathematics to other disciplines, and as a particular “area of knowledge” in the TOK course
11. develop the ability to reflect critically upon their own work and the work of others
12. independently and collaboratively extend their understanding of mathematics

Group 5 (mathematics) grade descriptors

Grade 7

Demonstrates a thorough knowledge and comprehensive understanding of the syllabus; successfully constructs and applies mathematical arguments at a sophisticated level in a wide variety of contexts; successfully uses problem-solving techniques in challenging situations; recognizes patterns and structures, makes generalizations and justifies conclusions; understands and explains the significance and validity of results, and draws full and relevant conclusions; communicates mathematics in a clear, effective and concise manner, using correct techniques, notation and terminology; demonstrates the ability to integrate knowledge, understanding and skills from different areas of the course; uses technology correctly in challenging situations—makes efficient use of calculator’s functionality when required.

Grade 6

Demonstrates a broad knowledge and comprehensive understanding of the syllabus; successfully constructs and applies mathematical arguments in a variety of contexts; uses problem-solving techniques in challenging situations; recognizes patterns and structures, and makes some generalizations; understands and explains the significance and validity of results, and draws relevant conclusions; communicates mathematics in a clear and effective manner, using correct techniques, notation and terminology; demonstrates some ability to integrate knowledge, understanding and skills from different areas of the course; uses technology correctly in routine situations—makes efficient use of calculator’s functionality when required.

Grade 5

Demonstrates a broad knowledge and good understanding of the syllabus; applies mathematical arguments in performing routine tasks; successfully uses problem-solving techniques in routine situations; successfully carries out mathematical processes in a variety of contexts, and recognizes patterns and structures; understands the significance of results and draws some conclusions; communicates mathematics effectively, using appropriate techniques, notation and terminology; demonstrates an awareness of the links between different areas of the course; makes use of calculator’s functionality when required—may occasionally be inefficient.

Grade 4

Demonstrates a satisfactory knowledge of the syllabus; applies mathematical arguments in performing some routine tasks; uses problem-solving techniques in routine situations; successfully carries out mathematical processes in straightforward contexts; shows some ability to recognize patterns and structures; has limited understanding of the significance of results and attempts to draw some conclusions; communicates mathematics adequately, using some appropriate techniques, notation and terminology; makes some use of calculator’s functionality, but perhaps not always when required—may be inefficient at times.

Grade 3

Demonstrates partial knowledge of the syllabus and limited understanding of mathematical arguments in performing some routine tasks; attempts to carry out mathematical processes in straightforward contexts; makes an attempt to use problem-solving techniques in routine situations; communicates some mathematics, using some appropriate techniques, notation or terminology; occasionally uses calculator’s functionality, but often inefficiently; does not always use it when required and may use an inefficient analytic approach.

Grade 2

Demonstrates limited knowledge of the syllabus; attempts to carry out mathematical processes at a basic level; communicates some mathematics, but often uses inappropriate techniques, notation or terminology; unable to use calculator correctly when required—questions exclusively requiring the use of the GDC are generally not attempted.

Grade 1

Demonstrates minimal knowledge of the syllabus; demonstrates little or no ability to use mathematical processes, even when attempting routine tasks; communicates only minimal mathematics and consistently uses inappropriate techniques, notation or terminology; is unable to make effective use of technology.

Approaches to Teaching and Learning

The IB Diploma Programme Approaches to Teaching and Learning are deliberate strategies, skills, and attitude that permeate the IB Teaching and Learning environment. The IB believes that a large influence on a student's education is not only what you learn by how you learn. Teaching students how to learn will improve the quality of teaching and learning across the entire IB spectrum of programmes.

The IB **approaches to learning** skills are:

- Thinking skills
- Communication skills
- Social skills
- Self-management skills
- Research skills

The IB **approaches to teaching** are:

- based on inquiry
- focused on conceptual understanding
- developed in local and global contexts
- focused on effective teamwork and collaboration
- differentiated to meet the needs of all learners
- informed by formative and summative assessment.

Approaches to Learning		BC - Core Competencies	
Communication	Communication Skills <ul style="list-style-type: none"> - Through interaction - Through language 	Communication	Connect and engage with others Acquire (research), interpret and present Explain, recount and reflect
Research	Information Literacy Skills Media Literacy Skills	Collaboration	Work together to pursue common purposes and goals
Social	Collaboration Skills	Social Awareness and Responsibility	Contributing to community/environment Problem solving Valuing diversity Building relationships
Self-Management	Organization Skills Affective Skills <ul style="list-style-type: none"> - Manage your own state of mind Reflection Skills	Personal Awareness and Responsibility	Self-determination Self-regulation Well-being
Thinking	Critical Thinking Skills Creative Thinking Skills Transfer <ul style="list-style-type: none"> - Skills and knowledge across different disciplines and subject groups 	Positive Personal and Cultural Identity	Relationships and cultural contexts Personal strengths, abilities, values and choices
		Creative Thinking	Novelty and value Generating ideas Developing ideas
		Critical and Reflective Thinking	Analyze and critique Question and investigate Develop and design

Assessment

Assessment of the student's skills will be an ongoing cycle throughout the course. Emphasis will be placed on skill development and growth. Students will be writing concept quizzes regularly (typically twice per week) to assess understanding of concepts. There will be some opportunities for students to correct and reassess their understanding of concepts. Concept quizzes will be assessed using the following criteria:

Insufficient Evidence	Emerging	Developing	Proficient	Extending
You do not yet understand the concept. You might have missed a lesson or have not completed any practice. You need more time with the concept and require extra help with it. You must attend Flex for extra support and practice. Keep trying! You will need to reassess your understanding when permitted.	You are beginning to make sense of the concept. You show some basic understanding but there are several conceptual misunderstandings. You will need extra support and practice to learn this concept. You should attend Flex for extra support and reassess your understanding when permitted and when sufficient evidence (corrections, concept summary) is handed in.	You understand most of the concept. There is at least one conceptual error in your work. You require clarification and some practice to test for proficiency again. You might attend Flex for extra support and practice. You can reassess your level of understanding when permitted and when sufficient evidence (corrections, concept summary) is handed in.	You fully understand the concept. There are no conceptual errors in your work. Your work is clear and easy to follow. You can solve the problems independently and consistently. You should start practicing higher level problems to extend your thinking.	You have mastered the concept. You have demonstrated mastery of a concept by applying conceptual understanding to solve a higher-level problem. These problems may connect multiple concepts and require application of concepts, critical thinking, strong reasoning and creative thinking. This is demonstrated through problem-solving and separate assessments from your concept quizzes.

Students will be given opportunities to develop their problem-solving skills and ability to apply their understanding of concepts to solve higher level problems. This will be practiced in class and assessed regularly. Comprehensive summative assessments (tests and projects) will take place less frequently and will assess student's ability to connect concepts together and transfer their learning to unfamiliar problems/tasks. At reporting time, the student and teacher will conference to discuss a percentage for the report card. Student understanding, feedback and goal setting is a continuous cycle that will be regularly discussed. If a student's level of understanding is below the minimum level required for the course, and/or there is insufficient evidence to report on their level of understanding, and an I-Report will be sent home. The report will include steps that must be taken in order to improve the student's grade.

	INSUFFICIENT EVIDENCE	EMERGING	DEVELOPING	DEVELOPING/ PROFICIENT	PROFICIENT	PROFICIENT/ EXTENDING	EXTENDING
IB SCALE	1	2	3	4	5	6	7
PERCENTAGE	0-49	50-69	70-75	76-85	86-89	90-95	96-100

Resources: A textbook will be issued (Mathematics 10 MYP 5, Haese Mathematics) to be returned at the end of the course. Some lessons will have supplementary worksheets.

Materials: binder, paper, ruler, whiteboard pen(s) and eraser, scientific calculator

Absences: If a student is absent for a day, they should log onto Teams and the Class Notebook to see what they missed or check with another classmate. If the absence is planned and the student knows ahead of time they can let their teacher know in advance to determine the work that should be completed. Students will be expected to catch up ASAP as the course moves quickly. Student should attend Flex the next morning to check-in about absence.

Extra Support: Students can receive extra support by attending Flex. Sometimes a student may be required to attend Flex for extra practice. Parents are encouraged to contact me via email if they have any concerns about the progress of their children.

Homework Expectations:

- Students should be actively using the concept checklist to track their own learning in the course.
- There will be practice questions for each lesson listed on the concept checklists. These practice assignments are used to reinforce the concepts learned in class, and the successful completion of these questions will help to prepare students for assessments. The questions are typically from the workbook and/or supplementary worksheets.
- Due to the fast pace of this course, extra practice outside of class is essential.
- Parents/guardians can support students by regularly monitoring work and achievements. 30-60 minutes should be set aside daily to complete practice problems and review previous concepts. Flex Time (8:56-9:22 Tuesday-Friday) can also be used for this.

Topics Covered:

Polynomials:

- Multiplying and dividing polynomials
- Adding and subtracting polynomials
- Multiplying polynomials
- Factoring polynomials
- Dividing polynomials

Rational Expressions:

- Evaluating rational expressions
- Simplifying rational expressions
- Multiplying and dividing rational expressions
- Adding and subtracting rational expressions
- Solving equations involving rational expressions
- Applications of rational expressions

Real Numbers:

- Adding and Subtracting Radicals
- Multiplying and Dividing Radicals
- Exponent laws and fractional exponents

Sequences and Series:

- Arithmetic sequences and series
- Geometric sequences and series
- Infinite Series
- Sigma notation

Quadratic Functions

- Solving Quadratic Equations
- Quadratic Formula and Discriminants
- Completing the Square
- Graphing Quadratics
- Quadratic Systems of Equations

Coordinate Geometry:

- Distance and Midpoint Formulas
- Slopes of lines
- Parallel and Perpendicular Lines
- Equations of lines
- Functions and Function Notation
- Relations
- Domain and Range

Trigonometry:

- Special Triangles
- Primary trig ratios
- Sine law and Cosine law
- Ambiguous case of the Sine law
- Angles in standard position
- Coterminal angles
- Trig functions of angles in standard position
- Solving trig equations



IB learner profile

The aim of all IB programmes is to develop internationally minded people who, recognizing their common humanity and shared guardianship of the planet, help to create a better and more peaceful world.

As IB learners we strive to be:

INQUIRERS

We nurture our curiosity, developing skills for inquiry and research. We know how to learn independently and with others. We learn with enthusiasm and sustain our love of learning throughout life.

KNOWLEDGEABLE

We develop and use conceptual understanding, exploring knowledge across a range of disciplines. We engage with issues and ideas that have local and global significance.

THINKERS

We use critical and creative thinking skills to analyse and take responsible action on complex problems. We exercise initiative in making reasoned, ethical decisions.

COMMUNICATORS

We express ourselves confidently and creatively in more than one language and in many ways. We collaborate effectively, listening carefully to the perspectives of other individuals and groups.

PRINCIPLED

We act with integrity and honesty, with a strong sense of fairness and justice, and with respect for the dignity and rights of people everywhere. We take responsibility for our actions and their consequences.

OPEN-MINDED

We critically appreciate our own cultures and personal histories, as well as the values and traditions of others. We seek and evaluate a range of points of view, and we are willing to grow from the experience.

CARING

We show empathy, compassion and respect. We have a commitment to service, and we act to make a positive difference in the lives of others and in the world around us.

RISK-TAKERS

We approach uncertainty with forethought and determination; we work independently and cooperatively to explore new ideas and innovative strategies. We are resourceful and resilient in the face of challenges and change.

BALANCED

We understand the importance of balancing different aspects of our lives—intellectual, physical, and emotional—to achieve well-being for ourselves and others. We recognize our interdependence with other people and with the world in which we live.

REFLECTIVE

We thoughtfully consider the world and our own ideas and experience. We work to understand our strengths and weaknesses in order to support our learning and personal development.

The IB learner profile represents 10 attributes valued by IB World Schools. We believe these attributes, and others like them, can help individuals and groups become responsible members of local, national and global communities.



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