



Course: Algebra I
Teacher: BTW Algebra I teachers
Year: IB MYP Year 4 (Grade 9)

Course Description:

This course focuses on:

- Foundations for Algebra
- Solving Equations
- Solving Inequalities
- An Introduction to Functions
- Linear Functions
- Systems of Equations and Inequalities
- Exponents and Exponential Functions
- Polynomials and Factoring
- Quadratic Functions and Equations
- Radical Expressions and Equations
- Rational Expressions
- Data Analysis and Probability

Our aims are:

The aims of teaching and learning mathematics are to encourage and enable students to:

- recognize that mathematics permeates the world around us
- appreciate the usefulness, power and beauty of mathematics
- enjoy mathematics and develop patience and persistence when solving problems

- understand and be able to use the language, symbols and notation of mathematics
- develop mathematical curiosity and use inductive and deductive reasoning when solving problems
- become confident in using mathematics to analyse and solve problems both in school and in real-life situations
- develop the knowledge, skills and attitudes necessary to pursue further studies in mathematics
- develop abstract, logical and critical thinking and the ability to reflect critically upon their work and the work of others
- develop a critical appreciation of the use of information and communication technology in mathematics
- appreciate the international dimension of mathematics and its multicultural and historical perspectives

You will begin to embody the IB Learner Profile as you display the following qualities: inquirer, knowledgeable, thinker, communicator, principled, open-minded, caring, risk-taker, balanced and reflective.

At the core of the MYP program is the unit/ guiding question and the areas of interaction (AOI's): There are five AOI's: approaches to learning, community and service, health and social education, human ingenuity, and environments. For every unit, there will be a guiding/unit question and an area of interaction that will provide a framework and give our classroom a context. The areas of interaction are the fuel that fires our intellectual pursuit. The following are our units:

Title	AOI	Question	Topic	Assessment
Foundations for Algebra	Human Ingenuity	How can you represent quantities, patterns, and relationships? How are properties related to Algebra?	Variables and properties	Formative Assessment
Solving Equations	Human Ingenuity	Can equations that appear to be different be equivalent? How can you solve equations? What kinds of relationships can proportions represent?	Equivalence, Solving Equations and inequalities, proportionality	Formative Assessment
Solving Inequalities	Human Ingenuity	How do you represent relationships between quantities that are not equal/ Can inequalities that appear to be different be equivalent? How can you solve inequalities?	Variables, Equivalence, Solving Equations and inequalities	Formative Assessment
An Introduction to Functions	Human Ingenuity	How can you represent and describe functions? Can functions describe real-world situations?	Functions and modeling	Formative Assessment
Linear Functions	Community and Service/ Health and Social Ed.	What does the slope of a line indicate about the line? What information does the equation of a line give you? How can you make predictions based on a scatter plot?	Proportionality, Functions, and modeling	Formative Assessment
Systems of	Health &	How can you solve a system of equations or inequalities?	Solving Equations and	Formative

Equations and Inequalities	Social Education	Can systems of equations model real-world situations?	Inequalities and Modeling	Assessment
Exponents and Exponential Functions	Environment	How can you represent very large and very small numbers? How can you simplify expressions involving exponents? What are the characteristics of exponential functions/	Equivalence, Properties and Functions	Formative Assessment
Polynomials and Factoring	Community and Service	Can two algebraic expressions that appear to be different be equivalent/ How are the properties of real numbers related to polynomials?	Equivalence and Properties	Formative Assessment
Quadratic Functions and Equations	Human Ingenuity	What are the characteristics of quadratic functions? How can you solve a quadratic equations/	Functions and Solving Equations and inequalities	Formative Assessment
Radical Expressions and Equations	Human Ingenuity	How are radical expressions represented? How can you solve a radical equation?	Equivalence and Solving Equations and Inequalities	Formative Assessment
Rational Expressions	Human Ingenuity	How are rational expressions represented? How can you solve a rational equation?	Equivalence and Solving Equations and inequalities	Formative Assessment
Data Analysis and Probability	Community and Service	How can collecting and analyzing data help you make decisions or predictions? How can you make and interpret different representations of data? How is probability related to real-world events?	Data Collection and Analysis, Data Representation, Probability	Formative Assessment

At the end of the year, the following IB MYP specific objectives will be covered:

A: Knowledge and understanding

Knowledge and understanding are fundamental to studying mathematics and form the base from which to explore concepts and develop problem-solving skills. Through knowledge and understanding students develop mathematical reasoning to make deductions and solve problems.

At the end of the course, students should be able to:

- know and demonstrate understanding of the concepts from the five branches of mathematics (number, algebra, geometry and trigonometry, statistics and probability, and discrete mathematics)
- use appropriate mathematical concepts and skills to solve problems in both familiar and unfamiliar situations including those in real-life contexts

- select and apply general rules correctly to solve problems including those in real-life contexts.

B: Investigating patterns

Investigating patterns allows students to experience the excitement and satisfaction of mathematical discovery. Mathematical inquiry encourages students to become risk-takers, inquirers and critical thinkers. The ability to inquire is invaluable in the MYP and contributes to lifelong learning. Through the use of mathematical investigations, students are given the opportunity to apply mathematical knowledge and problem-solving techniques to investigate a problem, generate and/or analyse information, find relationships and patterns, describe these mathematically as general rules, and justify or prove them.

At the end of the course, when investigating problems, in both theoretical and real-life contexts, student should be able to:

- select and apply appropriate inquiry and mathematical problem-solving techniques
- recognize patterns
- describe patterns as relationships or general rules
- draw conclusions consistent with findings
- justify or prove mathematical relationships and general rules

C: Communication in mathematics

Mathematics provides a powerful and universal language. Students are expected to use mathematical language appropriately when communicating mathematical ideas, reasoning and findings—both orally and in writing.

At the end of the course, students should be able to communicate mathematical ideas, reasoning and findings by being able to:

- use appropriate mathematical language (notation, symbols, terminology) in both oral and written explanations
- use different forms of mathematical representation (formulae, diagrams, tables, charts, graphs and models)
- move between different forms of representation.

Students are encouraged to choose and use ICT tools as appropriate and, where available, to enhance communication of their mathematical ideas. ICT tools can include graphic display calculators, screenshots, graphing, spreadsheets, databases, and drawing and word-processing software.

D: Reflection in mathematics

MYP mathematics encourages students to reflect upon their findings and problem-solving processes.

Students are encouraged to share their thinking with teachers and peers and to examine different problem solving strategies. Critical reflection in mathematics helps students gain insight into their strengths and weaknesses as learners and to appreciate the value of errors as powerful motivators to enhance learning and understanding.

At the end of the course students should be able to:

- explain whether their results make sense in the context of the problem
- explain the importance of their findings

- justify the degree of accuracy of their results where appropriate
- suggest improvements to the method when necessary.

The methodology or the “how” we will learn:

- **knowledge-acquisition skills**—an understanding of mathematical concepts and ideas, as defined in the framework
- **problem-solving skills**—mathematical strategies to solve problems in familiar and unfamiliar situations, in both mathematical and real-life contexts
- **communication skills**—oral and written skills using mathematical language, symbols and notation, and a range of forms of representation (for example, drawings, diagrams, graphs, tables)
- **thinking skills**—coherent logical and abstract thinking, inductive and deductive reasoning, justification and proof, estimation and accuracy
- **information literacy skills**—the ability to use the library and other media to access information, selecting and judging information critically, knowing how to acknowledge references and how to avoid plagiarism
- **information and communication technology skills**—confident use of computer applications and calculators when analysing problems, expressing a clear line of mathematical reasoning by use of technology
- **collaborative skills**—the ability to work as a team member, listening and interacting with others, respecting and considering different points of view
- **reflection skills**—evaluation of one’s own work and performance, identifying personal strengths and weaknesses to improve learning.

The state of Oklahoma generally expects that students are able to do certain things. You should be able to:

- Organizational skills, study practices and attitudes towards work
- Collaborative skills
- Communication
- Information literacy
- Reflection
- Problem solving and thinking skills

Assessment is the term used to measure the students’ demonstrations of learning:

There will be summative assessment projects and tests to show what they have learned. These will be assessed using the IB MYP criteria:

- Criterion A Knowledge and understanding Maximum 8
- Criterion B Investigating patterns Maximum 8
- Criterion C Communication in mathematics Maximum 6
- Criterion D Reflection in mathematics Maximum 6

During the year each of these criteria will be measured at least twice, not necessarily at the same time. Because this is criterion based assessment you are not measured against others – it is not normative. All work will be compiled in a **portfolio**.

Internal Grading Policy Varies by individual teachers

Resources and materials:

- Textbooks
- Workbooks
- Internet worksheets
- Teacher made worksheets
- Teachers in the department