

# PROGRAM OUTCOMES

(QUALITY SCHOOLS INTERNATIONAL)

## \*MATHEMATICS\*

(JULY 2013)

The Mathematics program of Quality Schools International is related to the following Exit Outcomes:

### **I. Success Orientations -**

- Trustworthiness
- Responsibility
- Concern for Others
- Kindness/Politeness
- Group Interaction
- Aesthetic Appreciation
- Independent Endeavor

### **II. Competencies -**

- Numeracy and Mathematical Skills
- Commercial Skills
- Thinking and Problem Solving Skills
- Decision Making and Judgment Skills
- Real-Life Applications

### **III. Knowledge -**

- Mathematics
- Science

There are two basic divisions of the Mathematics program of Quality Schools International, as follows:

**I. Elementary Mathematics** – normally engaged beginning in the 5-year-old class and completed in the 12 or 13 year old class. However, some students may demonstrate mastery of these outcomes before this, while others may not attain mastery until in secondary school. This body of knowledge consists of:

- The whole numbers (number sense, operations, relations, and properties)
- Numeration (names for numbers, place value, and computational procedures)
- Computation and estimation (paper & pencil, mental, and with calculators)
- Measurement/Time
- Geometry
- Problem solving and real-life applications
- Number theory (divisibility, prime & composite numbers, and factors & multiples)
- Rational numbers (fractions and decimals with their operations, relations, and properties)
- Probability and statistics
- Pre-algebra

- Graphing

The appropriate use of hand calculators is a part of the mathematics program at all levels.

A student who has little or no knowledge of English receives special instruction in mathematics designed to assist in gaining a mathematics vocabulary. During this time, however, the student is engaged in the essential outcomes of mathematics at his level of achievement, also taking into consideration his level of achievement in English.

The use of the computer is built into all course levels with a view to computer literacy and the development of higher order thinking skills. This alignment includes the introduction of computer application skills such as; Tables, Spreadsheets, Word Processing, and Media Presentations, in the 5 through 11 year old classes.

## II. **Secondary Mathematics** – eight courses form this division:

> **Algebra** – normally engaged by students of the 13-year-old class or first year secondary. Mastery of the outcomes of elementary mathematics must be demonstrated as a prerequisite for entry, which may delay the engagement of some students past the first year secondary, or allow younger students to enroll. This course is a requirement for graduation. The content is as follows:

- The numbers of ordinary arithmetic and algebra
- Integers, rational numbers, and algebraic expressions and equations.
- Solving equations and inequalities
- Polynomials
- Factoring polynomials
- Linear equations with graphing
- Applied problems using systems of equations
- Algebraic fractional expressions
- Radical notation
- Quadratic equations and problem solving

> **Geometry** – normally engaged by students of the first or second year secondary. Mastery of the first ten essential unit outcomes of the Algebra course must be demonstrated as prerequisites for entry. The content is as follows:

- Logic/Reasoning
- Elements of geometry
- Geometrical relationships
- Measurement and geometry
- Geometry of the circle
- Congruent triangles and their applications
- Proportions and similarity
- Trigonometry

> **Advanced Mathematics I** – normally engaged in the third year secondary. Mastery of the essential unit outcomes of Algebra and Geometry must be demonstrated as prerequisites for entry. The content is as follows:

- Linear equations and inequalities
- Quadratic functions
- Polynomials and their functions
- Exponential and logarithmic functions
- Powers, roots, and radicals
- Trigonometric ratios and functions
- Rational equations and functions
- Quadratic relations and conic sections
- Probability and statistics
- Applications of trigonometric functions
- Systems of equations and Matrices

> **Advanced Mathematics II** – normally engaged in the third or fourth year secondary. Mastery of the essential unit outcomes of Advanced Mathematics I must be demonstrated as a prerequisite for entry. Also the use of a designated graphing calculator is required. The content is as follows:

- Functions and Their Graphs
- Polynomial Functions
- Further Polynomial, and Rational Functions
- Exponential and Logarithmic Functions
- Trigonometric Functions
- Analytic Trigonometry
- Additional Topics in Trigonometry
- Sequences and series
- Conics
- Parametric and Polar Equations

> **AP Calculus (AB)** – normally engaged in the fourth year secondary. Mastery of the essential unit outcomes of Advanced Mathematics II must be demonstrated as a prerequisite for entry. Also the use of a designated graphing calculator is required. The content is as follows:

- Limits and their properties
- Differentiation
- Applications of Differentiation
- Further Applications of Differentiation
- Integration
- Further Integration
- Differential Equations and Applications of Differentiation
- Review and Practice of Past AP Exams
- Further Applications of Integration
- Advanced Integration Techniques

> **AP Statistics** – normally engaged in the fourth year secondary. Mastery

of the essential unit outcomes of Advanced Mathematics I must be demonstrated as a prerequisite for entry. Also the use of a designated graphing calculator is required. The content is as follows:

- Exploring Data
- Modeling distributions of data and describing relationships
- Designing studies
- Probability
- Random Variables
- Sampling distributions and estimating with confidence
- Testing a claim and comparing two populations
- Inference for distributions of categorical data and more about regression

> **Consumer Mathematics** – may be engaged in any secondary year. Mastery of the essential unit outcomes of Algebra must be demonstrated as a prerequisite for engagement. The content is as follows:

- Earning an income
- Understanding your paycheck
- Purchasing and budgeting
- Banking
- Consumer credit
- Living expenses
- Transportation
- Managing money
- Insurance
- Types of businesses
- Money Investment

Each of the above secondary courses consists of ten essential unit outcomes and each has selective unit outcomes in which students may engage for additional secondary credits. Also special unit outcomes may be designed for some students as independent-study units under the guidance of the appropriate instructor. In certain cases a student may also engage in any of the essential or selective outcomes as an independent-study unit.

---

**To qualify for the secondary academic graduation diploma, each student is required to attain mastery of at least thirty unit outcomes in the Mathematics program including the essential outcomes of Algebra and Geometry.**