# Port Moresby International School

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Unit & Assessment Outline for Students & Parents Grades 7 – 10.

| Year | **2026** | Grade | 9 | Semester | 2 |
|---|---|---|---|---|---|
| Course Title | IGCSE Additional Mathematics | | | | |
| Curriculum Taught | Cambridge IGCSE 0606 | | | | |
| Topics | Counting Principles, Binomial Theorem, Polynomials, Equations and Inequations and Vectors | | | | |

Assessment

| Week | Topic(s) | Type of Task | Weighting |
|---|---|---|---|
| 4 | Logarithms, exponentials and Permutations & Combinations and Binomial Theorem | Test | 25% |
| 9 | Polynomials | Test | 25% |
| 13 | Equations and Inequations. Absolute value functions and inequations. | Test | 25% |
| 16 | Vectors Test | Test | 25% |

Learning outcomes against which the students will be reported

Students should be able to:

- Understands and applies permutations and combinations to solve problems.
- Understands and uses the binomial theorem to expand and analyse binomial expressions.
- Can factorise polynomials and can apply the Factor and Remainder Theorems to solve polynomial equations.
- Solves and graphs a range of equations and inequalities and interprets their solutions.
- Understands the concept of vectors, can use vector notation and solve problems involving vector quantities.

**Course Aims/Goals**

The aims of this course are to:

- consolidate and extend elementary mathematical skills, and use these in the context of more advanced techniques.
- further develop knowledge of mathematical concepts and principles, and use this for problem solving.
- appreciate an interconnectedness of mathematical knowledge.
- devise mathematical arguments and use and present them precisely and logically.
- develop the confidence to apply mathematical skills and knowledge in appropriate situations.
- develop creativity and perseverance in the approach to problem solving.

**Content Outline**

| Weeks | Content Outline | Curriculum Links |
|---|---|---|
| 1-2 | Exploring graphs of logarithmic functions: transformations. Basic Counting Principle. Permutations & Combinations, Factorial notation. Problems involving Permutations and combinations Binomial Expansions for $(a+b)^n$, Pascal's Triangle | 6.1<br>11.3 – 11.3<br>12.1 – 12.2 |
| 3-4 | Problems involving Permutations and combinations Pascal's Triangle Binomial Expansions for $(a+b)^n$, Counting Principles and Binomial Test. | 11.3<br>12.1 – 12.2 |
| 5-6 | Polynomial: Define, operations, synthetic and long division, roots and factors, equality | 3.1, 3.2 |
| 7-8 | Remainder theorem, factor theorem. Sum and product of roots. Solving cubic Equations. Sketching cubic Functions. Polynomials Test | 3.2, 3.3<br>4.4 |
| 9-10 | Evaluating absolute value expressions and functions, graphing absolute value functions. Revise Linear & quadratic inequalities, sign diagram. Solving non-linear (e.g. quadratic inequalities, rational inequalities). | 1.4<br>2.5 |
| 11-12 | Solving absolute value equations and inequations using algebra and graphing. Solving cubic inequalities using technology. Equations, Inequations, Absolute value functions and inequalities Test | 4.1 4.2, 4.5 |
| 13-14 | Vectors: Scalars and vectors, vector notation, position vectors, equal, zero and negative vectors. Vectors in a plane: component and unit vector form. Magnitude of a vector. Unit vector. Operations with vectors, vector between two points, parallelism and unit vector, collinear points | 13.1-13.4 |
| 15-16 | Lines: Vector, parametric and Cartesian plane. Constant velocity problems. | 13.1-13.4 |
| 17-18 | Vector Test<br>Equation of a circle with centre (a,b) and radius r, Solve problems involving the intersection of a circle and a straight line | 8.1, 8.2 |
| 19-20 | Solve problems involving tangents to circles and the intersection of two circles | 8.3. 8.4 |