Gymea Technology High School
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Year 11 Mathematics Extension 1

Task 2: Yearly Exam

Due Date: 18th September 2025

Task Distributed: 1st September 2025

Units: Polynomials, Further Work on Functions, Working with Combinatorics, Further Trig Identities & **Harder Advanced Questions**

Task Type: Formal Examination

Task Weighting: **40%** (100% Report Mark)

Outcomes: ME11.1, ME11.2, ME11.3, ME11.5, ME11.7

Task Description

You will have 1 hour 30 minutes, plus 10 minutes reading time to complete the examination
This exam will consist of two sections.

- **Section 1:** 10 multiple choice questions worth one mark each covering a range of the units listed above.
- **Section 2:** A mixture of short and long response questions worth one mark or more each.

Your knowledge, skills and understanding in the following areas can be assessed in this examination:

Polynomials

- Understand the definition, notation and terminology of a polynomial
- Use long division to factorise a polynomial
- Use and prove the remainder and factor theorems
- Use properties of roots and coefficients to solve problems and equations
- Understand and apply the multiplicity property
- Sketch a range of polynomials

Working With Combinatorics

- List and count the number of ways an event can occur
- Use factorial notation to describe and determine the number of ways n different items can be arranged in a line or a circle
- Solve problems involving cases where some items are not distinct
- Solve simple problems and prove results using the pigeonhole principle
- Solve problems involving permutations and restrictions with or without repeated objects
- Solve practical problems involving permutations and combinations, including those involving simple probability situations
- The binomials expansion and Pascal's triangle

Further Trigonometry Identities

- Use the sum and difference expansions for the trigonometric functions sin $(A \pm B)$, cos $(A \pm B)$ and tan $(A \pm B)$
- Use the double angle formulae for sin $2A$, cos $2A$ and tan $2A$
- Use expressions for sin A, cos A and tan A in terms of t where $t = \tan tan \frac{A}{2}$
- Use the formulae for trigonometric products as sums and differences for cos A cos B, sin$A$sin$B$, sin$A$cos$B$ and cos$A$sin$B$

Further Work on Functions

- Solve a range of inequalities including quadratics, rational expressions with unknowns in the denominator and absolute values using both algebraic and graphical techniques.
- Use the reflection property of the graph of a function and the graph of its inverse
- Examine the relationship between the graph of $y = f(x)$ and the graph of $y = \frac{1}{f(x)}$ and hence sketch the graphs
- Examine the relationship between the graph of $y = f(x)$ and the graphs of $y^2 = f(x)$ and $y = \sqrt{f(x)}$ and hence sketch the graphs
- Examine the relationship between the graph of $y = f(x)$ and the graphs of $y = |f(x)|$ and $y = f(|x|)$ and hence sketch the graph
- Examine the relationship between the graphs of $y = f(x)$ and $y = g(x)$ and the graphs of $y = f(x) + g(x)$ and $y = f(x)g(x)$ and hence sketch the graphs
- Convert linear and quadratic functions, and circles from parametric form to Cartesian form and vice versa
- Sketch linear and quadratic functions, and circles expressed in parametric form

As this is an examination you will need to prepare for this task by:

- Making summary notes of each topic listed above (mind map, flow chart, dot points).
- Accessing practice past papers on Moodle.
- Regularly completing practice examination questions.
- Seeking teacher assistance on unclear work.
- Ensuring all set work is up to date.

NESA Glossary of Key Words

Understand the verb associated with the task. The verb will provide an understanding of the detail needed to successfully answer the question.

- **Calculate -** Provide a numerical answer
- **Demonstrate -** Show by example
- **Evaluate -** Make a judgement based on criteria; determine the value of
- **Prove / Show -** Provide all algebraic steps and working in a logical sequence
- **Simplify** - Write an expression in its simplest form
- **Sketch -** Neatly draw a function on a number plane, clearly showing key features
- **Solve -** Use algebraic techniques to find a solution

Check the NESA Glossary of Key Words for further guidance
https://educationstandards.nsw.edu.au/wps/portal/nesa/11-12/hsc/hsc-student-guide/glossary-keywords

Details of Submission

For successful completion of this assessment, you must have the following equipment:

- Board approved calculator
- Pencil, eraser and ruler for graphs and diagrams
- Blue or black pen

Students are NOT permitted to bring an electronic device into the exam.

Teacher Feedback and Student Self-Reflection

- The task will typically be returned to students within 14 days of the due date.
- At this time feedback including information on how to improve will be provided through analysis of the examination questions as a class discussion. Explanation will be provided as requested.
- Students can clarify or seek further feedback by speaking with their teacher or the assessment marker.

Upon return of the task, students will also be expected to complete a self-reflection. This will require students to review incorrect responses by seeking clarification from the teacher. Additionally, students will be required to complete a survey in reflection of the examination.

How does this link to my learning?

- The structure of the questioning style in this task will mirror that of the HSC examination.
- This task will be used by you and your teachers to assess your knowledge and understanding of course outcomes and allow you to refine your skills as you prepare for the HSC examination.
- This task will draw together the above outcomes and assess your ability to apply a range of mathematical skills and techniques that you have covered in class.

Assessment Procedures

All students should be fully aware of the School Assessment Procedures for their year group. These were provided at the beginning of the school year and are available on the school website under the Learning Tab for each year group.