![Gymea Technology High School — INSPIRE. LEARN. SUCCEED.]

Year 12 Mathematics Advanced

Assessment Task 1 – In Class Test

Due Date: Tuesday 26th November , Week 7 Term 4

Date Distributed: Tuesday 12th November   **Task Weighting: 20%**

Outcomes

MA11-1 uses algebraic and graphical techniques to solve, and where appropriate, compare alternative solutions to problems

MA11-5 interprets the meaning of the derivative, determines the derivative of functions and applies these to solve simple practical problems

MA11-6 manipulates and solves expressions using the logarithmic and index laws, and uses logarithms and exponential functions to solve practical problems contexts

MA11-9 provides reasoning to support conclusions which are appropriate to the context

---

ASSESSMENT OUTLINE

1. WHAT AREAS OF LEARNING DOES THIS ASSESSMENT ADDRESS?

You will need to develop solutions and provide reasoning to a wide variety of problems and demonstrating your understanding of the following concepts:

Calculus	Intro to Logarithms
- Applications of limits of functions - Distinguish between continuous and discontinuous functions - The gradient of a secant to a curve - The tangent as the limiting position of a secant - The gradient of a tangent - The gradient function - Notations and formal definitions of the gradient to a curve $y = f(x)$ where $x = c$ - Differentiation from first principals - Establish that $\tan \theta = m$ - Applying derivatives to the movement of particles	- define logarithms as indices: $y = a^x$ is equivalent to $x = \log_a y$, and explain why this definition only makes sense when $a>0$, $a \neq 1$ - recognise and sketch the graphs of $y = a^x$, $y = a^{-x}$ and $y = \log_a x$ - recognise and use the inverse relationship between logarithms and exponentials - understand and use the fact that $\log_a a^x = x$ for all real x, and $a^{\log_a x} = x$ for all $x > 0$

Logarithm Laws	
- derive the logarithmic laws from the index laws and use the algebraic properties of logarithms to simplify and evaluate logarithmic expressions: $\log_a m + \log_a n = \log_a(mn)$ $\log_a m - \log_a n = \log_a\left(\dfrac{m}{n}\right)$ $\log_a(m^n) = n\log_a m$ - consider different number bases and prove and use the change of base law: $\log_a x = \dfrac{\log_b x}{\log_b a}$	- interpret and use logarithmic scales, for example decibels in acoustics, different seismic scales for earthquake magnitude, octaves in music or pH in chemistry - solve algebraic, graphical and numerical problems involving logarithms in a variety of practical and abstract contexts, including applications from financial, scientific, medical and industrial contexts

2. WHY IS THE COMPLETION OF THIS ASSESSMENT IMPORTANT?

- This task will draw together the above outcomes and assess a range of mathematical skills and techniques that you have covered in class.
- The structure and questioning style presented in this task will mirror that of the HSC examination.
- You will be required to apply your knowledge to a series of unseen questions require you to problem-solve solutions.
- It will be used by you and your teachers to assess your knowledge and understanding of the course outcomes, allowing you to refine your skills in preparation for the HSC examination.

3. WHAT STEPS DO I TAKE TO COMPLETE THIS TASK?

Task Outline

This is a 1 period in class test. This task will be completed in exam conditions in class on **Tuesday 26th November** (Period 6), during your regular timetabled lesson. A HSC Reference Sheet will also be provided.

The examination consists of the following two compulsory sections:

- **Section 1: Multiple-Choice**. This section contains 5 multiple-choice questions worth 1 mark each covering a range of the concepts listed in the Areas of Learning above. These must be answered on the multiple choice answer sheet in your answer booklet. You should allow **8 minutes** to complete this section.

- **Section 2: Written Response.** This section contains two questions with parts worth a total of 12 marks each. The parts of each question will be a mixture of short and long response questions worth 1 mark or more covering a range of the concepts listed in the Areas of Learning above. You should allow **40 minutes** to complete this section. You need to complete your answers in the space provided under each question. All necessary working must be shown for this section.

Preparation for this Task

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

- Creating your summary notes page covering each topic listed above (you can use mind maps, flow charts, dot point lists).
- Regularly complete practice examination questions.
- Seeking teacher assistance on unclear work.
- Ensuring all set work is up to date.

Details for Submission

For successful completion of this examination you must bring the following equipment.

- Board approved calculator
- Blue or black pen,
- Pencils and eraser for graphs
- A ruler

Students who are absent from the examination, or have a legitimate reason for missing the task, must notify the school before the exam commences. To avoid a zero mark being awarded, any absence must be supported by valid misadventure/illness documentation as outlined in the Year 12 Assessment Booklet.

You will also need to complete a self-reflection on your assessment that is to be submitted to your teacher after receiving the solutions. This is to assist you and your teacher in refining your knowledge, skills and examination technique for future assessments.

4. HOW WILL MARKS BE AWARDED TO MEASURE MY LEARNING?

Worked solutions with marking criteria for each question will be provided when the exam is marked and returned. You should ensure that you go through these solutions thoroughly to correct your mistakes and ask your teacher if there is anything you are unsure about.