2024 Senior Mathematics Day – DRAFT Program

Saturday Nov 23rd 2024, University of Queensland

Time	Essential Mathematics	General Mathematics	Mathematical Methods	Specialist Mathematics
8:30-9:10	Registration – Venue: Gordon Greenwood (Bldg 32), University of Queensland			
9:10 – 9:30	Welcome			
	Essential Mathematics	**General Mathematics**	**Mathematical Methods**	**Specialist Mathematics**
9:30-10:25	Preparing assessment for the 2025 syllabus in General and Essential Mathematics using assessment for the 2019 syllabus – Robyn McNamara, Principal Education Officer for General Mathematics, QCAA (9-11am, Room 215)		Teaching the Binomial Theorem backwards - Joe Ousby, Senior Teacher of Mathematics (Methods and Specialist Room 209)	Exam Reflections Peter Fox, Texas Instruments (Methods and Specialist, Room 210)
10:30:11:25			ICU – Methods Heather Meinecke, Assistant HOD, Brisbane Boys' College (Room 209)	Enjoy your teaching of Maths. Robert Nelder (Methods and Specialist, Room 210)
11:30-12:00	Lunch and networking (Foyer)			
12:00-12:55	Reteaching basic operations (and algebra) when it hasn't worked before. Tierney Kennedy, Education Consultant, Kennedy Press (Room 215)		Methods Reno: Rethinking the IA2 and IA3 exams Tom Sprenger, St Joseph's College, Gregory Terrace (Room 209)	Applications of Senior Mathematics in Astronomy Stephen Broderick, Mathematics and Science teacher, St Ursula's College (Room 210)
13:00 – 14:55	Using Building Thinking Classroom practices in the Senior space - Suella Lye, HOD Mathematics Glenmore SHS (Room 210)		Preparing assessment for the 2025 syllabus in Mathematical Methods and Specialist Mathematics using assessment for the 2019 syllabus. – Catherine Smith, Principal Education Officer in Mathematics, QCAA (Room 215)	
15:00-	Grab afternoon tea and join us for the 2024 QAMT AGM (Foyer)			
15:05-15:30	**QAMT Annual General Meeting (Room 215)**			

Abstracts

Using Building Thinking Classroom practices in the Senior space - Suella Lye, HOD Mathematics Glenmore SHS

This session is hands on, and participants will have the opportunity to interact with BTC activities, and how to create their own.

Preparing assessment for the 2025 syllabus in Mathematical Methods and Specialist Mathematics using assessment for the 2019 syllabus. – Catherine Smith, Principal Education Officer for Mathematical Methods and Specialist Mathematics, QCAA

The session will focus on creating a Mathematical Methods IA2 for the 2025 syllabus, starting with an IA2 from the 2019 syllabus. Through the examination development, the session will look at movement of subject matter, technology access in examinations and resources available.

Preparing assessment for the 2025 syllabus in General and Essential Mathematics using assessment for the 2019 syllabus – Robyna McNamara, Principal Education Officer for General Mathematics, QCAA

The session will focus on creating a General Mathematics IA2 for the 2025 syllabus, starting with an IA2 from the 2019 syllabus. Through the examination development, the session will look at increasing and decreasing the complexity of questions and how to write complex unfamiliar questions. The session will also explore opportunities for writing an IA1 using Unit 4 subject matter.

ICU – Methods - Heather Meinecke, Assistant HOD, Brisbane Boys' College

The task of creating complex unfamiliar questions is inherently tricky and is made trickier still when the endorsement landscape is changeable. When the task of creating a marking scheme that will reward partial understanding is thrown into the mix, then the tricky landscape can turn treacherous. Come and share your experiences navigating this terrain as we analyse CU questions from IA s and EA s.

Exam Reflections - Peter Fox, Texas Instrument

Why did my students get that question wrong? This session will focus on how we can use past exams (and assessments) to improve future student outcomes.

Teaching the Binomial Theorem backwards - Joe Ousby, Senior Teacher of Mathematics

What are the benefits of starting with "expand $(x+y)^n$ for small positive integers n", going on to Pascal's Triangle, then (n r), etc. This workshop is informed by two-years experience marking questions requiring the use of binomial probability in Methods external exams and 5 years teaching Mathematical Methods.

Applications of Senior Mathematics in Astronomy - Stephen Broderick, Mathematics and Science teacher, St Ursula's College

There are many mathematical applications of linear, logarithmic, exponential and trigonometric functions in astronomy. Some of these applications include:- the stellar magnitude scale, determining the distance to a galaxy using Cepheid variables, determining the tilt of the Earth's axis and the eccentricity of the Earth's orbit.

In this session, several Problem-solving and Modelling Tasks (PSMTs) will also be presented. (No telescope required as all data is freely available on the web) These PSMTs include:- predicting when Jupiter's shrinking Great Red Spot will disappear, determining the length of daylight hours for a given latitude based on the maximum altitude of the Sun and using SpaceX telemetry data. Other astronomical activities will include determining the angular velocity of a pulsar with a microphone and calculating the mass of a planet based on the orbital period of its moons.

Reteaching basic operations (and algebra) when it hasn't worked before - Tierney Kennedy, Education Consultant, Kennedy Press

For some students, traditional methods for basic operations and algebra just don't work – they forget steps, they don't understand what the are doing, and they can't make use of basic facts as they don't know them. In this workshop we will explore alternative methods for addition, subtraction, multiplication and division that tend to be far more successful for these students and are also great for juniors.

Enjoy your teaching of Maths - Robert Nelder, Retired Teacher

Often when teaching a topic in any level of school Maths, it's possible to go a little further and show students an illuminating aspect of where the topic can take us! Students love that, and it's fun for us teachers too. We'll look at exciting things that can be done with a few topics, which will come from the following, or perhaps others that people might request:-

1) Let's see how normal trigonometric curves in the Methods syllabus can lead us to draw polar curves resembling flower petals.
2) Flight Radar 24 shows us bearings, velocities, distances along meridians or parallels, and reconciles flight speed with constant latitude changes. Things here for Essential and General as well as Specialist and Methods.
3) Integration by parts shouldn't just stop with the textbook questions. We'll use Fourier series to mimic the saw-tooth function and the parabola. Specialist Maths here.
4) A Tower of Hanoi activity for proof by induction.
5) The "Rule of 70" would interest General Maths people as they verify it numerically, while Methods people can see how it's derived as an application of their work.
6) Look what's really happening when we change the variable in a definite integral.

Methods Reno: Rethinking the IA2 and IA3 exams - Tom Sprenger, St Joseph's College, Gregory Terrace

 The changes to the Methods syllabus require teachers to reflect on their current approach to the teaching-learning cycle and assessment design. How do we successfully assess both Tech-Free and Tech-Active skills? Which topics do we assess? Is there a one-size-fits-all approach?

 In this discussion-based session, we'll begin by identifying the obstacles we face in designing IA2 and IA3 tasks. I'll share sample tasks that I have written to motivate our discussion and support our shared understanding of developing effective assessment tasks in Methods.