CURRICULUM, PEDAGOGY AND BEYOND

THE MATHEMATICAL ASSOCIATION OF VICTORIA

MAV24 CONFERENCE

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Welcome to Session B24

Mastering Maths Methods Units 1 and 2: from Novice to Knowledgeable

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Mathematics Teacher
at Methodist Ladies' C...

WiFi logon

Network: LTUGuest

Username: MAVcon2024

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An overview of the course, including a sample course

VCE Units 1 and 2 Mathematical Methods

Study design (Accreditation Period 2023 – 2027) – Sample of the course outline is on the handout.

Follow the link below for the mathematical methods study design, be familiar with the content:
https://www.vcaa.vic.edu.au/curriculum/vce/vce-study-designs/mathematicalmethods/Pages/Index.aspx

Useful site:

https://www.khanacademy.org/ *This website provides examples via videos and practice questions*

https://mathsmethods.com.au/year11-free-resources/ *This website provides videos, free lessons for each topic, cheat-sheets & exam questions*

https://vicmathsnotes.weebly.com/methods-u12.html *This website provides notes, videos and interactives, questions and exam questions.*

Bound references:

Students are allowed to take one bound reference into the tech-active ***Examination 2*** *of the Topic Tests, as well as the Semester/End of Year Examination and the Investigation Task. All specifications and criteria are available on the VCAA website:*

https://www.vcaa.vic.edu.au/assessment/vce-assessment/materials/Pages/index.aspx#01

Formula sheet:

Available to students in all assessments (tech free and tech active) ***Sample of the formula sheet is on the handout***

Understanding of content knowledge

Removed/deleted from the previous Study Design

U1_AOS1: Topic: Functions, relations and graphs

- Graphs of polynomials of degree greater than 4, however, still implicitly present

U1_AOS2: Algebra

- Expansion of $(x + a)^n$, however, still implicitly present (power forms defined in AoS1)

U1_O1 Key skills

- Equations and by hand sketching of graphs of circles in the Cartesian plane (beyond operational knowledge of the unit circle in Unit 2)

U2_AOS3: Topic: Calculus

- Graphical and numerical approaches to approximating the gradient function
- Notations of derivative and first principles approach to derivatives
- Solving simple problems involving straight line motion
- Karnaugh maps (Still a required technique)

Understanding of content knowledge

Using correct ***notation***, ***conventions*** and use the ***names of functions***

* $e^x - 1/2(e^x + 1)$ is not the same as $\frac{e^x - 1}{2(e^x + 1)}$.
* Square root sign must go all the way down if it is a fraction: eg: $\sqrt{\frac{p(1-p)}{n}}$ not $\sqrt{\frac{p(1-p)}{n}}$
* If the question required $f'(x)$ ie. the derivative of $f(x)$, it was not acceptable to have your answer as $y =$
* If the question asked to find an antiderivative of the function $f(x)$ it was not acceptable have your answer as $f(x) =$
* If the question asked to find the rule for f^{-1}, the final answer must be $f^{-1}(x) = \cdots$, not $f^{-1} = \cdots$, not $y = \cdots$

* $\Pr(X < 2.5 | X < 3.5) \neq \frac{\Pr(X < 2.5) \cap \Pr(X < 3.5)}{\Pr(X < 3.5)}$

$\Pr(\geq 4 | \geq 2) = \frac{X \geq 4}{X \geq 2}$ or $\Pr(X \geq 4) | \Pr(X \geq 2)$

... none are acceptable !!!

Understanding of content knowledge

Transformation from $f(x)$ to $Af(n(x-b))+c$

where A, n, b and $c \in R$, and $A, n \neq 0$

Mapping: $(x, y) \rightarrow \left(\frac{1}{n}x + b, Ay + c\right)$

A sequence of transformations (remember DRT) are:

- A dilation factor of $|A|$ from the x – axis.
- If $A < 0$ then there is reflection in the x – axis.
- A dilation factor of $\frac{1}{|n|}$ from the y – axis.
- If $n < 0$ then there is reflection in the y – axis. Watch out for $f(n(b-x))$ with $n > 0$.
- A translation of b units along or parallel to the x – axis (to the right if $b > 0$, or to the left if $b < 0$).
- A translation of c units along or parallel to the y – axis (up if $c > 0$, or down if $c < 0$).

Transition period (HeadStart)

Assumed Student facility:

- U1_AOS1: Topic: Functions, relations and graphs
- Review of coordinate geometry
- Use of vertical line test to determine a function (as a sub-set of relations)

- U1_AOS2: Algebra, number and structure
- Inverse functions no longer appear in the AoS description, however, they remain in the key skills as a form of transformation

- U2_AOS1: Topic: Functions, relations and graphs
- Review of basic trigonometric ratios (SOHCAHTOA and applications)
- Measures of turn or rotation, degree to radian conversion

Sample of the examples and questions are available on the handout

How to teach specific concepts

Trigonometric Exact Values – Hand Trick!

Hold out your non-dominant hand.

$$\sin(\theta) = \frac{\sqrt{\text{Left fingers}}}{2}$$

$$\cos(\theta) = \frac{\sqrt{\text{Right fingers}}}{2}$$

$$\tan(\theta) = \frac{\sqrt{\text{Left fingers}}}{\sqrt{\text{Right fingers}}}$$

T. Pham

Writing/vetting an assessment

Roles of the Writer

The **writer** is responsible for creating the original assessment. Their primary role is to design and draft the questions and the marking scheme for the exam, test, or assignment

Roles of the Vetter

The **vetter** is responsible for reviewing the assessment created by the writer to ensure its quality, fairness, accuracy, and alignment with the curriculum. The vetter acts as a second pair of eyes and provides constructive feedback to the writer.

Key Differences

- **Role Focus:** The **writer** focuses on creating and drafting the assessment, while the **vetter** focuses on reviewing and improving it.
- **Responsibility for Content:** The **writer** is responsible for the overall design and content of the assessment. The **vetter** is responsible for ensuring the content is clear, fair, and aligned with the learning objectives.
- **Level of Involvement:** The **writer** takes the lead in crafting the assessment, while the **vetter** provides an objective, critical review of the assessment. The vetter helps identify any potential issues and suggests improvements.
- **End Result:** The **writer** ensures that the assessment is complete and that it meets the requirements, while the **vetter** ensures that the assessment is of high quality, free from errors, and fair to the students.

Collaboration

Both roles are vital in creating high-quality assessments that are aligned with learning outcomes and ensure fairness for students.

Refer to the handout for the full version.

Guidance on assessments, solutions and marking scheme

Please complete the following:

1. Sit the exam as if you were a student.
2. Identify whether each question belongs to **Exam 1** or **Exam 2**.
3. Allocate marks to each question.
4. Provide the marking scheme for each question.

Please make sure to bring your completed work to our

B24 - Mastering Maths Methods Units 1 & 2: From novice to knowledgeable session.

Solutions and Markingscheme will be available to the participants on the MAV24 Annual Conference Resources webpage.

Maximising the use of the CAS calculator in tech active

How to use Ti-Nspire CAS more efficiently and effectively?

SETTING UP AND NAVIGATING WITHIN THE CALCULATOR

Settings

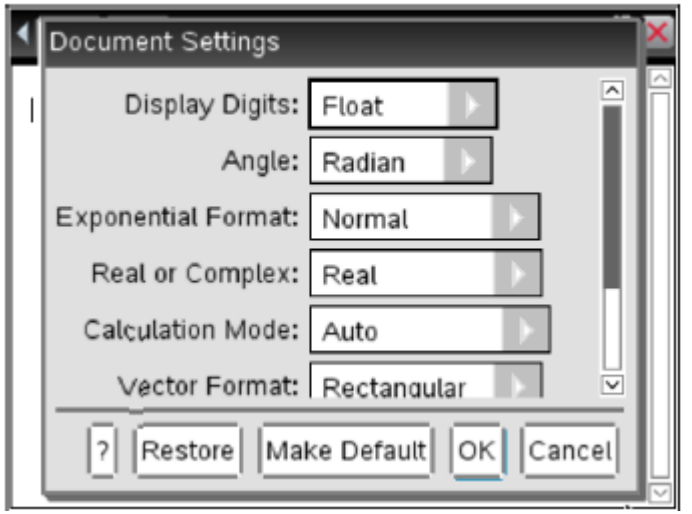
For the **calculator app** you can set via:

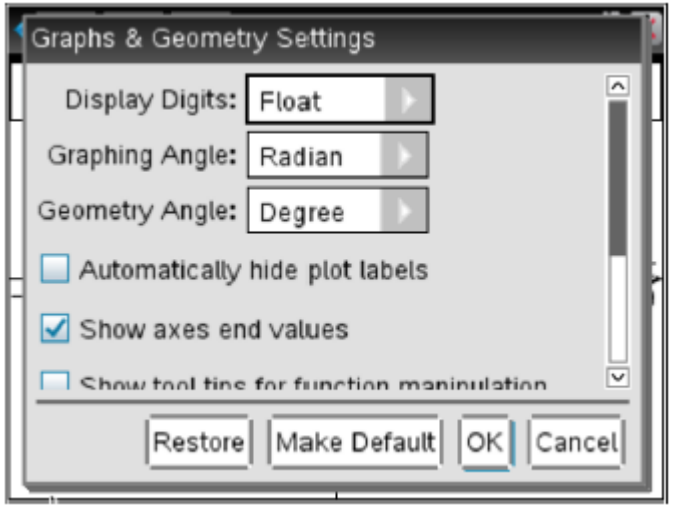
- the **homepage**, go to 5:Settings and select 2:Document settings or
- the calculator page, press **doc**, go to 7:Settings and status and select 2:Document settings

For the **graph app** you can set by pressing menu, go to 9:Settings

Refer to the handout for the full version

Below are the recommended settings:





Questions & feedback


“Thank You”

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Event App

App Download Instructions

Step 1: Download the App 'Arinex One' from the App Store or Google Play

App Store

Google Play

Step 2: Enter Event Code: **mav**

Step 3: Enter the email you registered with

Step 4: Enter the Passcode you receive via email and click 'Verify'. Please be sure to check your Junk Mail for the email, or see the Registration Desk if you require further assistance.

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Don’t Forget to Complete Survey through the Event App and **Be in it to WIN!**