# ***VCE Calculator Options and Considerations Video Transcript***

## **On the Independent Use of Software Calculators by a Year ten or VCE Student Using a Screen-reader and / or Braille Display**

Produced by Nathaniel Schmidt on behalf of the EduVis ‘Pat Roberts Accessible Calculator Benefit’.

## **Introduction**

### **Aim and General Audience**

Welcome to the Eduvis software calculator considerations analysis. My name is Nathaniel Schmidt. I completed my secondary Victorian Certificate of Education (VCE) in 2013 and am currently studying a Bachelor of Computer Science at Deakin University.

In the following videos, it is my intention to give you an overview of some of the different options available to vision impaired students, especially when it comes to software calculators, if you want to independently study maths at an intermediate or advanced level, especially in latter years of high school, from year ten upwards. If you have never yet thought about studying maths in late high school, especially if the reason is because you are worried about not being able to do the work, or if you are worried about not being able to get a good grade then I hope that the suggestions in this video will help to alleviate some of your concerns.

It is also hoped that more students who are already studying mathematics may consider transferring there skills over to independently using their own calculators, rather than completely relying on a human aid such as a teacher’s aid, a scribe for an exam, or a parent to get their work done.

If you have stumbled across this video outside of the Eduvis website and are still confused as to what this is all about, you can visit [eduvis.com.au](http://eduvis.com.au) for more information.

### **Specific Audience – Who is This Resource Really Meant For?**

If you are a vision impaired student anywhere in the world, or if you are a teacher who has a vision impaired student then we think it is quite likely that you will find these resources helpful. Having said that, most of what is said here will have very specific relevance to you if you are a high school student from Victoria, Australia, studying according to the educational specifications outlined by the Victorian Curriculum and Assessment Authority (VCAA). If you are a year ten student and wish to continue mathematics studies in years eleven and twelve, it is hoped that the following information may make your transition much easier.

## **A Note on Calculators**

### **CAS Calculators**

CAS stands for Computer Algebra System. A CAS calculator allows for manipulation of a computer to use the same mechanical techniques that a human mathematician would use in order to solve complex equations. It takes away a lot of the working out process so that you can just type in an equation to get the answer. You can do this with quadratics (linear equations), polynomials, combinatorics and a whole range of other things. They are really helpful and make school and homework a lot faster. CAS calculation is built into some scientific and graphing calculators; and they are the type of calculator that VCAA wants students to use when students study VCE. Even if you use a different type of calculator, such as a graphing or scientific calculator, you may still find some of this information helpful, since CAS capabilities are already built into many of these devices, hardware and software calculators alike.

### **Difference Between CAS and Scientific Calculators**

Sometimes there is a difference between a CAS calculator and a scientific calculator but sometimes there isn’t. If you are not sure whether you are using scientific or CAS calculator, it is always good to check whether or not your calculator has CAS functionality built into it as a programmable application. If you live in Victoria then In years seven, eight and nine, you get to use basic scientific calculators which can deal with certain aspects of geometry and trigonometry, probability and statistics, finance, engineering measurements and logarithms. But sometimes you will want to use a calculator to solve, simplify or expand complex algebraic expressions, or to deal with counting permutations and combinations involving matrices, as well as many other things. To do this, it can be helpful to use a Computer Algebra system to replicate the same procedures that you would use yourself when you want to solve an equation on paper.

In Australia, outside of Victoria, different states use either graphing or scientific calculators. But in Victoria, as already stated, you have to use a specialised scientific calculator that can perform CAS-related operations.

## **Personal Reflection**

On a personal note,

## **Using Software Calculators**

When you are studying any subject at any level, it is always good to try your best to work within a standard that is closest to the technical specifications outlined by the overseeing educational body that your school is under. In Victoria, the good thing is that VCAA has already approved at least four software applications that you can use on your computer as a CAS calculator, so you don’t necessarily have to make too many compromises in order to work around the requirements for your education. In this examination, we will be looking at three of these solutions. We will also have a look at a fourth solution, Maxima, which is the free and open-source software calculator that a software engineering friend and I used in order to helps us do CAS Maths, or Mathematical Methods in years 11 and 12. We will examine some of the features of these calculators, along with the pros and cons of each solution when compared with each other. We will not be able to cover absolutely everything that you can use these calculators for in your studies, so it will still be very important for you to do your own homework, to figure out extra features you may need in order to perform calculations from examples or exercises in a textbook or workbook.

• Nathaniel’s reflections from experience i.e. what would have been good to know?

o It would have saved a lot of time to have a guide that contained the procedural functions I needed to perform all the tasks required for each unit in a maths subject. I had to do my own homework and sometimes had to consult a friend who knew much more than I did because I couldn’t always find the answer.

• Available and approved CAS software calculators:

o Maple

o Mathematica

o Matlab

• Modes of usage:

o GUI: None or possibly Maple.

o CLI: Maple and Mathematica.

o Web app frontend: Matlab.

• Compatibility across common devices and platforms.

o Maxima.

• Compatibility with common screen-readers.

• Ease of locating and learning commands for operation.

• Flexability and intuitivism.

• Support for teachers on using CAS in CLI.

• Demonstrate mathematical examples.