 Logarithmic and exponential functions

Resources

[AMSI website – Supporting Australian Mathematics Project](http://www.amsi.org.au/ESA_Senior_Years/SeniorTopic3/3_md/SeniorTopic3h.html) (A guide for teachers year 11 and 12) has a good comprehensive overview of Integration.Calculator emulator for interactive whiteboards are useful to show students the appropriate buttons to use especially the difference between log (log base 10) and ln (natural logarithm - base e)Geogebra or other Graphing software is useful for drawing graphs in this unit.

| Content | Teaching strategies and activities | Resources |
| --- | --- | --- |
| Properties of logarithms (log rules, including change of base rule). | The words exponent, base and logarithm should be understood.  Students should be able to move easily between    Sometime should be taken to ensure students have some memory aid that allows them to make the association  e.g. The log function asks what power must I raise the base  to get the number  It is explicitly stated in the syllabus that computational examples of change of base and algebraic properties of logarithms are examinable.  i.e. Algebraic properties    Change of base    Students should have a memory aid they can use for change of base (e.g. in  the  is higher than the  giving a spacial hook for which is on the numerator and which is on the denominator)  The distinction should be made between  and ( or )especially regarding calculator use | Discussions of Logarithms being used in measurements such as pH, Richter Scale and decibels may help students connect this topic to everyday experiences  [YouTube video – Logarithms, Explained – Steve Kelly](https://youtu.be/zzu2POfYv0Y) |
| Properties of exponential functions.  Properties of log functions. | Use graphing software to graph a number of different exponential and logarithmic graphs. By graphing these as families of graphs students should be able to form their own rules on what exponential and logarithmic functions look like.   Logarithms should be seen as the inverse of exponentials. |  |
| Differentiation and integration of exponential and logarithmic functions. | Within this section of the course, the function of a function rule (chain rule), product rule and quotient rule should be revisited with the use of exponential and logarithmic functions.  Integrals of  and  should be derived from their primitive functions.  Problems involving definite and indefinite integrals, area and solids of volumes of revolutions should be revisited with the use of exponential and logarithmic functions. | [Paul’s Online Math Notes – Derivatives of Exponential and Logarithm Functions](http://tutorial.math.lamar.edu/Classes/CalcI/DiffExpLogFcns.aspx)  [Animations webpage on the exponential function](http://www.animations.physics.unsw.edu.au/jw/calculus.htm#exp) (this link needs to be copied and pasted into your browser). |

Scope and Sequence note – (taken directly from syllabus) This particular section might well benefit by splitting it into two parts. The algebraic sections can be taught before calculus is introduced.

Note – index Laws should be revisited before studying properties of logarithms.