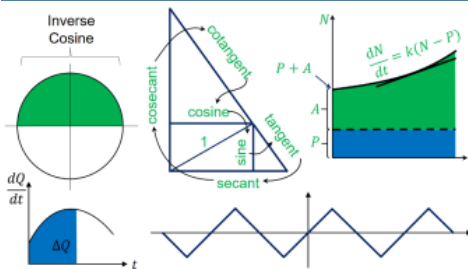


# Mathematics Extension 1 Year 11: In Depth Part III - Trigonometry & Rates of Change

Presented by Steve Howard



A comprehensive guide to the knowledge & techniques needed to teach Trigonometric Functions & Rates of Change from the new Maths Extension 1 Year 11 syllabus.

Format: 2. Online

Audience: Mathematics teachers of any experience level who are preparing to teach the new Extension 1 syllabus.

## Description

I created this course to provide teachers with a comprehensive guide to the knowledge and techniques required to teach the new NSW Mathematics Extension I Year 11 syllabus. The course covers every dot point from the new NSW Year 11 Mathematics Extension 1 syllabus, both old and new content. Please note that only Extension 1 content is covered, not Mathematics Advanced.

The course goes into greater detail than the textbooks, so teachers are more comfortable in their ability to deliver the content. All 106 proofs and examples have been recorded, so that you can watch an experienced maths teacher talk through the examples and any important points to note.

Part III of the series covers ME-T1 Inverse Trigonometric Functions, ME-T2 Further Trigonometric Identities and ME-C1 Rates of Change. These topics have Functions and Calculus from Advanced as prerequisites.

New and existing content is explored in detail, including interesting and more efficient techniques that experienced teachers may not have seen before. Important points to be covered with students are noted, and the limits of the syllabus are discussed. As more detail on the syllabus is released by NESA any changes required will be made. Also included are related skills that are beyond the syllabus that you can use to extend more capable students.

The course includes a 175 page course handout, including an additional 106 practice questions matching the examples from the course, with fully worked solutions. A suggested scope and

sequence for Year 11 Advanced and Extension 1 for combined classes is provided, plus a lesson by lesson breakdown of the Advanced, Extension 1 and Extension 2 courses for Year 11 and 12 to help you create your own scope and sequences.

Part I of the series covers ME-A1 Working with Combinatorics and ME-F1 Further Work with Functions (Part A) F1.1: Graphical relationships.

Part II of the series covers ME-F1 Further Work with Functions (Part B) and ME-F2 Polynomials.

### **Additional notes about this format**

#### **Teaching Standards**

2.1.2 Proficient Level - Content and teaching strategies of the teaching area

6.2.2 Proficient Level - Engage in professional learning and improve practice

#### **Are you in NSW? If so, this is relevant for you**

Completing this course will contribute 10 hours of NSW Education Standards Authority (NESA) Registered PD addressing 2.1.2 & 6.2.2 from the Australian Professional Standards for Teachers towards maintaining Proficient Teacher Accreditation in NSW.

TTA (Teacher Training Australia) is endorsed to provide the NSW Education Standards Authority (NESA) Registered Professional Development for teachers accredited at Proficient and Lead Level Teacher.

### **Occurrences**

<b>Start Date</b>	<b>Location</b>	<b>Price</b>
Now	Online	\$269 + GST

## **Sessions**

### **Introduction**

**10 minutes**

Course Administration

Introduction to the Mathematics Extension 1 In Depth Year 11 Series

Introduction to Part III

### **Introduction to Trigonometry**

**5 minutes**

Introduction to Trigonometry

## **Trigonometry 1: Cyclometry**

**50 minutes**

Lesson 1 Overview

A Deeper Understanding of Trigonometry

The Unit Circle and the (simplified) Origins of Trigonometry

The Hexagon Mnemonic

Trigonometric Ratios and Intervals in the Unit Circle

## **Trigonometry 2: Inverse Trigonometric Functions - Definitions and Sketching**

**40 minutes**

Lesson 2 Overview

Angle Size and Arc Length

Inverse Sine and Arc Sine

Inverse Trig Functions

Inverse Sine Function

Inverse Cosine Function

Inverse Tangent Function

Inverse Trigonometric Ratios for all Intervals

## **Trigonometry 3: Inverse Trigonometric Functions - Further Manipulation**

**50 minutes**

Lesson 3 Overview

Function of a Function Background Information

Trig Function of an Inverse Trig Function

Inverse Trig Function of a Trig Function - Restricted Domain

Inverse Trig Function of a Trig Function - Full Domain

Properties of inverse trigonometric functions

## **Trigonometry 4: Compound Angles**

**40 minutes**

Lesson 4 Overview

Compound Angle Results

Alternative Proofs - Sum of Angles

## **Trigonometry 5: Double Angle Results**

**35 minutes**

Lesson 5 Overview  
Applications of Compound Angles  
Double Angle Results

## **Trigonometry 6: t-formulae**

**40 minutes**

Lesson 6 Overview  
Ratios in terms of the tan of half angles

## **Trigonometry 7: Product to Sum Identities**

**50 minutes**

Lesson 7 Overview  
Product to Sum Identities  
Sum to Product Identities

## **Trigonometry 8 (Optional): Beyond the Syllabus**

**1 hour**

Lesson 8 Overview  
Graphing Inverse Trig Function of a Trig Function  
Further Trig and Inverse Trig Identities  
Trig Functions in Terms of Each of the Other Ratios (with Example)  
Trig of Inverse Trig Identities

## **Introduction to Rates of Change**

**5 minutes**

Introduction to Rates of Change

## **Rates of Change 1: Simple Rates of Change**

**45 minutes**

Lesson 1 Overview  
Rates of Change Background Information  
Graphing a Quantity  
Graphing the Rate of Change

## **Rates of Change 2: Motion along a straight line**

**45 minutes**

Lesson 2 Overview  
Motion Along a Straight Line  
Motion graphs

### **Rates of Change 3: Simple Exponential Growth and Decay**

**45 minutes**

Lesson 3 Overview  
Simple Exponential Growth and Decay  
Graphing Simple Exponential Growth and Decay

### **Rates of Change 4: Modified Exponential Growth and Decay**

**45 minutes**

Lesson 4 Overview  
Modified Exponential Growth Model  
Graphing Modified Exponential Growth and Decay  
Newton's Law Of Cooling

### **Rates of Change 5: Rates of Change Involving Two or More Variables**

**45 minutes**

Lesson 5 Overview  
The Chain Rule and Simplifying Related Rates of Change

### **Conclusion**

**1 minute**

Conclusion to Part III

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## About the presenter



### Steve Howard

#### Creator

Steve is a Mathematics Teacher at Cowra High School, a medium sized rural high school in Central West NSW, where he has taught for 25 years. He has also taught gifted and talented students online through xsel and Aurora College. He has a particular love and passion for Mathematics Extension 2, writing his own textbook and study resources for the old syllabus, to be updated for the new syllabus. He also creates study resources for Mathematics and Extension 1. He loves finding more efficient techniques for solving mathematical questions, by trawling through other teachers' solutions or making up his own approaches when there must be a better way. Steve did 4 Unit Mathematics as a student, gaining a mark of 198/200 and training as an actuary. Working in an office in the city wasn't for him, so he went back to uni to retrain as a teacher then headed to the country, where he lives in an owner built mud house, with chickens, goats and rescued native birds (which you will sometimes hear in his recordings)!!



## Enrol now to secure your spot

Limited spots are available. Please enrol online or fax your enrolment to 1300 667 691 to secure your spot.

Please note, by submitting this enrolment form you are confirming that you have been given financial approval by your employer to attend this course. Cancellation advice should be given in writing 7 days before the commencement of this course.

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Product: Mathematics Extension 1 Year 11: In Depth Part III - Trigonometry & Rates of Change

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Occurrence  
Date:

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Your Name:

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Your email  
address:

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Employer  
name:

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Employer  
phone:

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Enrol online at <http://tta.edu.au>