

## Chapter notes: 9 Trigonometric equations and identities

### Overview

*This is a very important chapter, with ideas from it being used in vectors and calculus. We recommend around six teaching hours.*

### Introductory problem

This problem is an example of modelling similar to the introductory problem in the previous chapter. At this stage, a graph should be used to solve the resulting equation, and it should prompt the question of how we could know how many solutions there are. The worked solution is given at the end of the chapter, page 247; the idea being that students should be able to answer the question using the methods covered in the chapter.

### 9A Introducing trigonometric equations, p216

In SL, inverse trigonometric functions are only used to solve equations. Their graphs and properties are not required, neither is the notation  $\arcsin$ , etc.

### 9B Harder trigonometric equations, p224

The method used in Key point 9.4 is our recommendation for solving this problem. However it is possible to apply other methods, such as sketching a transformed graph.

*Hints for the grade 7 questions:*

9. Make the substitution  $y = x^2$ .

### 9C Trigonometric identities, p233

This section applies many ideas from section 3E.

### 9D Using identities to solve equations, p236

Students will need to be very familiar with the ideas from chapter 3 for this section. In particular they must use factorisation to solve equations, rather than dividing by functions. They should also be very aware of hidden quadratics. Unfortunately there are no absolute rules for dealing with these identities

– it is not always the case that  $\tan x$  should be replaced with  $\frac{\sin x}{\cos x}$ . Students should be aware that

there can be more than one solution method, and that they may have to be creative about making links using trigonometric identities.

### 9E Double angle identities, p239

The proof in this section is unlikely to be tested in examinations. However, it shows useful ways of thinking about geometrical proofs.

*Hints for the grade 7 questions:*

8. Express  $\cos 4\theta$  first in terms of  $\cos 2\theta$ .
9. Use the substitution  $x = 2A$ .
10. Express  $\sin 4x$  in terms of  $\sin 2x$  and  $\cos 2x$ . Then link  $\cos 2x$  to  $\sin x$ .