

Chapter notes: 10 Geometry of Triangles and circles

Overview

This chapter follows on from chapter 9 as it uses trigonometric equations particularly applied to the sine rule. Many of the concepts may already be familiar so we would recommend approximately four hours of teaching time.

Introductory problem

This problem should encourage students to visualise and consider whether given information is sufficient to solve a given problem. The worked solution is given at the end of the chapter, page 287; the idea being that students should be able to answer the question using the methods covered in the chapter.

10A Right-angled triangles, p251

This section shows how the definitions of sine and cosine, given in section 8B, are consistent with the trigonometry within presumed knowledge.

10B The sine rule, p254

Hints for the grade 7 questions:

- Note that the observer's feet are on the ground, but the angles of depression and elevation are relative to his head.
- Try to find a sine which is greater than one, as this would be impossible.

10C The cosine rule, p261

Hints for the grade 7 questions:

- Use the cosine rule to form a quadratic equation.

10D Area of a triangle, p267

The 'Research explorer' box (page 268) refers to Heron's formula:

$$\text{area} = \sqrt{s(s-a)(s-b)(s-c)}$$

where, $s = \frac{1}{2}(a + b + c)$.

10E Trigonometry in three dimensions, p270

Hints for the grade 7 questions:

- Use Pythagoras in triangle ABR.

10F Length of an arc, p275

Students may already know how to find arc length when in degrees. This provides an opportunity for discussing whether degrees or radians are ‘more natural’.

Hints for the grade 7 questions:

- 12.** The radius of the sector is the slant length of the cone. The arc length is the perimeter of the base of the cone.

10G Area of a sector, p279

There are no specific teacher notes for this section.

10H Triangles and circles, p282

Hints for the grade 7 questions:

- 5.** (c) Split the area into two segments.