The Ambiguous Case

Specification: AQA 7357: E1 · Edexcel 9MA0: 5.1

INDEPENDENT **You do**

A · Find both possible angles

1 In triangle ABC, $AB = 7$ cm, $AC = 5.5$ cm and angle $ABC = 48°$. Find the two possible values of angle ACB.

2 In triangle ABC, $AB = 12$ cm, $AC = 10$ cm and angle $ABC = 52°$. Find the two possible values of angle ACB.

3 In triangle PQR, $PQ = 15$ cm, $PR = 11$ cm and angle $PQR = 36°$. Find the two possible values of angle PRQ.

4 In triangle ABC, $AB = 6$ cm, $AC = 5$ cm and angle $ABC = 47°$. Find the two possible values of angle ACB.

B · One, two or none?

5 In triangle ABC, $AB = 5$ cm, $AC = 7$ cm and angle $ABC = 63°$. Find angle ACB.

6 In triangle ABC, $AB = 10$ cm, $AC = 8.5$ cm and angle $ABC = 57°$. Find all possible values of angle ACB.

7 In triangle ABC, $AB = 9$ cm, $AC = 4$ cm and angle $ABC = 30°$. Find angle ACB.

8 In triangle ABC, $AB = 6$ cm, $AC = 9$ cm and angle $ABC = 118°$. Find angle ACB.

C · Reasoning No calculator for this section.

9 In triangle ABC, $AB = 8$ cm, angle $ABC = 30°$ and $AC = b$ cm.
(a) Find the least possible value of b.
(b) How many triangles are there when $b = 3$, 4, 6, 8 and 9?

10 (a) Write down the obtuse angle whose sine equals $\sin 35°$.
(b) $\sin x = \sin 72°$ and $x \neq 72°$, with $0° < x < 180°$. Find x.
(c) Explain why the cosine rule never gives two possible angles.

11 In triangle ABC, $AB = 7$ cm, $AC = 9$ cm and angle $ABC = 40°$. Without finding it, explain why angle ACB has only one possible value.

D · Multi-step and modelling

12 In triangle ABC, $AB = 11$ cm, $AC = 8$ cm and angle $ABC = 42°$.
(a) Find the two possible values of angle ACB.
(b) Find the two possible lengths of BC.
(c) Find the difference between them.

13 In triangle ABC, $AB = 10$ cm, angle $ABC = 35°$ and $AC = k$ cm. There are two possible triangles. Find the set of possible values of k. Give the lower limit exactly and to 3 s.f.

14 A straight road passes through point B. A phone mast M is 9 km from B, and the angle between BM and the road is 28°. The mast has a range of 6 km. Find the length of road that is within range of the mast.

E · Exam-style question Use the mark scheme to self-assess.

15 In triangle ABC, $AB = 12$ cm, $AC = 9$ cm and angle $ABC = 46°$.
(a) Find the two possible values of angle ACB, showing that both are possible. [3 marks]
(b) Given that angle ACB is obtuse, find BC. [3 marks]