Sine rule cosine rule and triangle area

Learn and practise | Free preview

A sample from this topic. The complete topic collection contains three different resources and worked solutions.

Read the explanation and worked example. Show your working; use a calculator only where asked.

What you will practise

• Solve non-right triangles with the sine rule, cosine rule and included-angle area formula.

• Explain a method and check the reasonableness of a result.

Useful starting skills: Use the prerequisite operations and representations shown in the worked example.

Use a/sin(A)=b/sin(B)=c/sin(C), where each side is opposite its matching angle. Use the cosine rule $c^2=a^2+b^2-2ab\cos(C)$ when the included angle and its two sides are known, or to find an angle from three sides.

The area formula is Area=ab sin(C)/2, with C between sides a and b. In an SSA sine-rule problem, an acute inverse-sine answer and its supplement can both be possible; check the angle sum and side conditions. All angles in this set are in degrees unless stated otherwise.

Worked example

Two sides of a triangle are 6 cm and 8 cm, with included angle 60 degrees. Find the opposite side.

$c^2=6^2+8^2-2\times6\times8\times\cos(60 \text{ degrees})$.

$c^2=100-48=52$.

Answer: $c=2\sqrt{13}$ cm, approximately 7.21 cm

Try it yourself

Name: _____ Date: _____

1. A triangle has A=30 degrees, B=60 degrees and opposite side a=5 cm. Find b exactly.

2. Find the third side when two sides are 5 cm and 7 cm with included angle 60 degrees.

Answers and explanations

Check the method as well as the final answer. An alternative correct method is also valid.

1. $5\sqrt{3}$ cm

$b=5 \sin(60 \text{ degrees})/\sin(30 \text{ degrees})$.

2. $\sqrt{39}$ cm

$c^2=25+49-70\times1/2=39$.

Curriculum reference: VC2M10ASP02

Independent original resource. Not published or endorsed by VCAA. This focused set supports the listed skills; it is not a complete course or an official assessment.

This free preview may be shared intact with attribution. Not for sale.