

Sine and Cosine Rule



AS-Level

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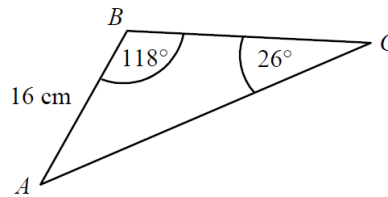
A-Level

Small Angle Approximations

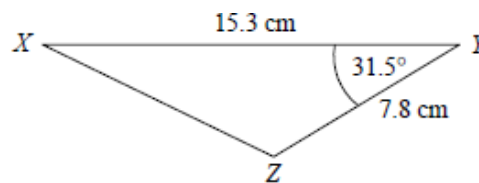
Solving Trigonometry Equations

Trigonometric Proof

1. The diagram shows triangle ABC in which $AB = 16$ cm, $\angle ABC = 118^\circ$ and $\angle ACB = 26^\circ$. Find the length AC to 3 significant figures. (2)

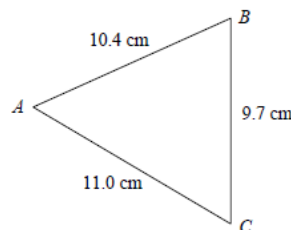


2. The diagram shows triangle XYZ in which $XY = 15.3$ cm, $YZ = 7.8$ cm and $\angle XYZ = 31.5^\circ$. Find the length XZ to 2 significant figures. (2)

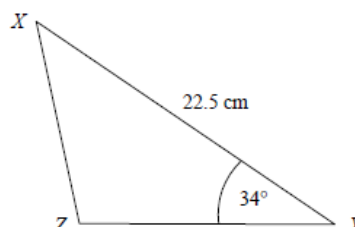


3. Joanne walks 4.2 miles on a bearing of 138° . She then walks 7.8 miles on a bearing of 251° .
 a. Calculate how far Joanne is from the point where she started. (2)
 b. Find, as a bearing, the direction in which Joanne would have to walk in order to return to the point where she started. (4)

4. The diagram shows triangle ABC in which $AB = 10.4$ cm, $AC = 11.0$ cm and $BC = 9.7$ cm. Find the area of the triangle to 3 significant figures. (5)



5. The diagram shows triangle XYZ in which $XY = 22.5$ cm and $\angle XYZ = 34^\circ$. Given that the area of the triangle is 100 cm², find the length XZ . (4)



Mark Scheme

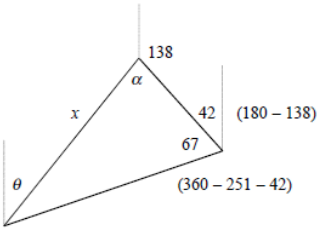
1.

$\frac{AC}{\sin 118} = \frac{16}{\sin 26}$ $AC = \frac{16 \times \sin 118}{\sin 26}$	M1
$AC = 32.2 \text{ cm (to 3 s.f)}$	M1

2.

$XZ^2 = 7.8^2 + 15.3^2 - (2 \times 7.8 \times 15.3 \times \cos 31.5)$ $= 91.422$	M1
$XZ = 9.56 \text{ cm (to 3 s.f)}$	M1

3a.

	
$x^2 = 4.2^2 + 7.8^2 - (2 \times 4.2 \times 7.8 \times \cos 67)$ $x^2 = 52.879$	M1
$x = 52.879$	M1

3b.

$\frac{\sin \alpha}{7.8} = \frac{\sin 67}{7.2718}$	M1
$\sin \alpha = \frac{7.8 \times \sin 67}{7.2718} = 0.9874$	M1
$\alpha = 80.882$	M1
$\theta = 138 + \alpha - 180 = 38.882$	M1
Bearing = 039° (nearest degree)	M1

4.

$9.7^2 = 10.4^2 + 11.0^2 - (2 \times 10.4 \times 11.0 \times \cos \angle BAC)$	M1
$\cos \angle BAC = \frac{10.4^2 + 11^2 - 9.7^2}{2 \times 10.4 \times 11} = 0.5903$	M1
$\angle BAC = 53.819$	M1
Area = $\frac{1}{2} \times 10.4 \times 11.0 \times \sin 53.819$	M1
Area = 46.2 cm^2	M1

5.

Area = $100 = \frac{1}{2} \times 22.5 \times YZ \times \sin 34$	M1
$YZ = \frac{200}{22.5 \times \sin 34} = 15.896$	M1
$XZ^2 = 22.5^2 + 15.896^2 - (2 \times 22.5 \times 15.896 \times \cos 34)$	M1
$XZ^2 = 165.906$	M1
$XZ = 12.9 \text{ cm (3 s.f)}$	M1

