Guide to:
Area of any triangle

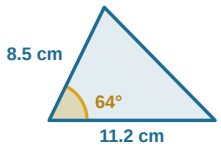
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Explanation:

The area of any triangle can be found using **Area = $\frac{1}{2}$ab sin C**, where **a** and **b** are two sides and **C** is the **included angle** sandwiched directly between them. If you are given two angles instead of the included angle, use angles in a triangle (180°) to find the included angle first.

When working backwards from a given area to find an unknown angle C, remember that **sin(180° − θ) = sin θ**: if the question states the angle is obtuse, subtract the calculator's acute angle from 180°.

Example 1: Find the area of a triangle with sides 8.5 cm and 11.2 cm and included angle 64° (3 s.f.).



Solution:

Substitute a = 8.5, b = 11.2, C = 64°:

Area = $\frac{1}{2}$ × 8.5 × 11.2 × sin 64°

Area = 47.6 × sin 64° = 42.7826... cm^2

Answer: 42.8 cm^2 (3 s.f.)

Example 2: A triangle has sides 9 cm and 12 cm and area 45 cm^2. Given angle C is obtuse, find C (1 d.p.).

Solution:

$\frac{1}{2}$ × 9 × 12 × sin C = 45 ⇒ 54 sin C = 45

sin C = $\frac{45}{54}$ = $\frac{5}{6}$

Acute angle = $\sin^{-1}(\frac{5}{6})$ = 56.442...°

Obtuse angle C = 180° − 56.442...° = 123.557...°

Answer: 123.6° (1 d.p.)

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