Guide to:
The sine rule

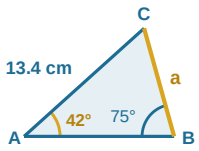
maths Links

Explanation:

Use the Sine Rule when a non-right-angled triangle involves **two opposite side-angle pairs**. To find a missing side, put sides on top: $\frac{a}{\sin A} = \frac{b}{\sin B}$. To find a missing angle, flip the fractions to put sines on top: $\frac{\sin A}{a} = \frac{\sin B}{b}$.

Always label each angle with a capital letter (A, B, C) and the side directly opposite it with the matching lowercase letter (a, b, c). Watch out for the ambiguous case if asked for an obtuse angle (180° − θ).

Example 1: In ΔABC, A = 42°, B = 75°, and b = 13.4 cm. Find side a (3 s.f.).



Solution:

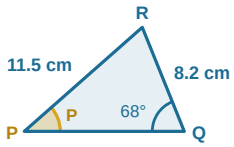
Use $\frac{a}{\sin A} = \frac{b}{\sin B}$:

$\frac{a}{\sin 42°} = \frac{13.4}{\sin 75°}$

$a = \frac{13.4 \times \sin 42°}{\sin 75°} = 9.2827...$ cm

Answer: a = 9.28 cm (3 s.f.)

Example 2: In ΔPQR, p = 8.2 cm, q = 11.5 cm, and Q = 68°. Find acute angle P (1 d.p.).



Solution:

Use $\frac{\sin P}{p} = \frac{\sin Q}{q} \Rightarrow \frac{\sin P}{8.2} = \frac{\sin 68°}{11.5}$

$\sin P = \frac{8.2 \times \sin 68°}{11.5} = 0.66112...$

$P = \sin^{-1}(0.66112...) = 41.385...°$

Answer: P = 41.4° (1 d.p.)

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