Sine Rule

The sine rule is:-

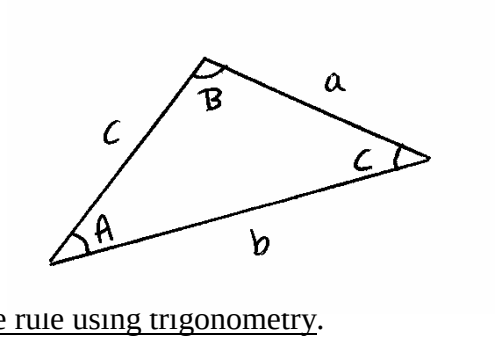
$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

Choose this formula for an unknown side

or $$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

Choose this formula for an unknown angle

To use the sine rule you must have a ***complete ratio*** – by that I mean you must know one side and its corresponding angle



<u>How to prove the sine rule using trigonometry</u>.

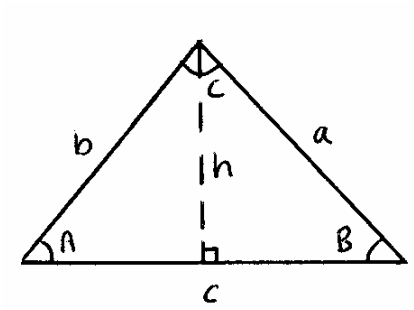
$$\sin B = \frac{h}{a} \qquad \sin A = \frac{h}{b}$$

$$h = a \sin B \qquad h = b \sin A$$

$$\therefore a \sin B = b \sin A$$

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

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

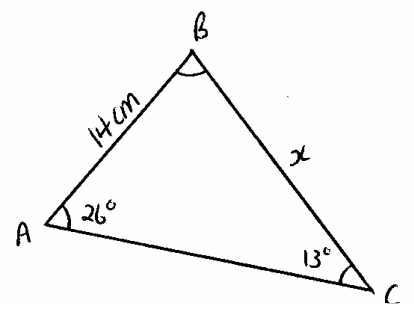


Finding an Unknown Length

Example 1 *Find the size of BC, given that AB = 14cm , ∠BAC = 26°, ∠ACB = 13°.*

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

$$\frac{x}{\sin 26^\circ} = \frac{14}{\sin 13^\circ}$$

$$x = \frac{14}{\sin 13^\circ} \times \sin 26^\circ$$

$$x = 27{\cdot}3\text{cm (1dp)}$$