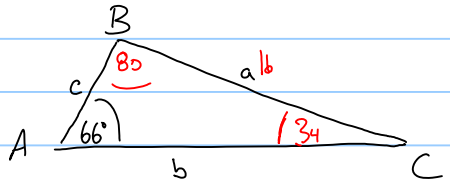
Sine Law

Note Title 26/09/2017

I This is a useful trig law used for triangles that are not 90° △'s (right triangles)

$$\frac{\text{Sine A}}{a} = \frac{\text{Sine B}}{b} = \frac{\text{Sine C}}{c} \quad \text{or} \quad \frac{a}{\text{Sine A}} = \frac{b}{\text{Sine B}} = \frac{c}{\text{Sine C}}$$

II To find a missing side: ∠'s have capital letters
sides " small letters



In △ABC ∠B = 80° ∠C = 34°
Find the length of AC or "b" to nearest tenth.

a) Get ∠A using 180° rule:

$$\begin{array}{r} 80 \\ 34 \\ \hline 114^\circ \end{array} \qquad \begin{array}{r} 180 \\ -114^\circ \\ \hline \end{array}$$

$$\frac{b}{\text{Sine B}} = \frac{a}{\text{Sine A}}$$

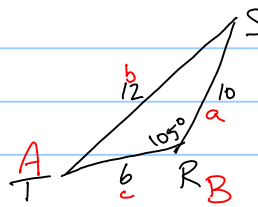
$$\frac{b}{\text{Sine } 80^\circ} = \frac{16}{\text{Sine } 66^\circ}$$ cross multiply

$$\frac{b \text{ Sine } 66^\circ}{\text{Sine } 66} = \frac{16 \text{ Sine } 80^\circ}{\text{Sine } 66}$$

$$b = \frac{16 \text{ Sine } 80^\circ}{\text{Sine } 66^\circ}$$

$$b = 17.2 \text{ m}$$

III To find a missing ∠ to nearest degree



Find ∠S

Steps: 1) label △ ABC etc
2) Pick 2 ratios
3) set up eqn

$$\frac{\text{Sine } C}{c} = \frac{\text{Sine } B}{b}$$

$$\frac{\text{Sine } C}{6} = \frac{\text{Sine } 105^\circ}{12}$$

$$12 \text{ Sine } C = 6 \text{ Sine } 105$$

$$\text{Sine } C = \frac{6 \text{ Sine } 105}{12}$$

$$\text{Sin}^{-1} C = \angle C$$

$$\angle C = 28.87$$

$$= 29^\circ$$