

Sine Law

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

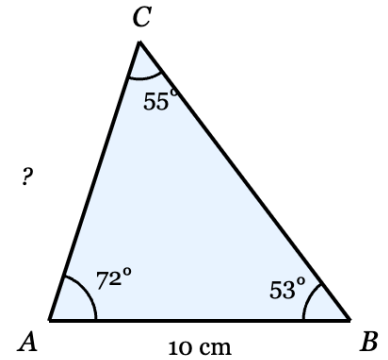
1. Find the length of side AC in the triangle below. Round to one decimal place.

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

$$\frac{b}{\sin 53^\circ} = \frac{10}{\sin 55^\circ}$$

$$\sin 53^\circ \left[\frac{b}{\sin 53^\circ} \right] = \left[\frac{10}{\sin 55^\circ} \right] \cdot \sin 53^\circ$$

$$b = \left(\frac{10}{\sin 55^\circ} \right) \sin 53^\circ \quad b \approx 9.7$$



2. Find the measure of angle B in the triangle below. Round to the nearest whole degree.

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

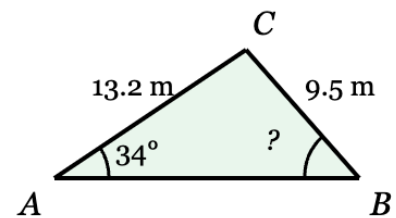
$$\frac{\sin 34^\circ}{9.5} = \frac{\sin B}{13.2}$$

$$13.2 \left[\frac{\sin 34^\circ}{9.5} \right] = \left[\frac{\sin B}{13.2} \right] 13.2$$

$$13.2 \left(\frac{\sin 34^\circ}{9.5} \right) = \sin B$$

$$\sin^{-1} \left(13.2 \left(\frac{\sin 34^\circ}{9.5} \right) \right) = \angle B \longrightarrow$$

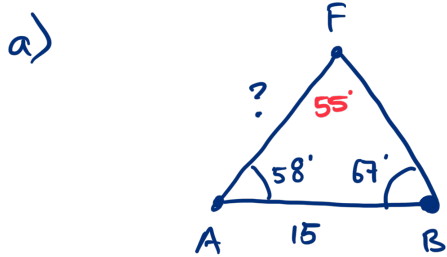
$$51^\circ \approx \angle B$$



3. Two forest fire lookout towers, A and B , are 15 km apart. A ranger at tower A spots a fire at point F . The angle between line AB and line AF is 58° . A ranger at tower B also spots the fire. The angle between line BA and line BF is 67° .

a) Sketch and label a diagram. Mark all given angles and the known side.

b) How far is the fire from tower A ? Round to the nearest tenth of a kilometre.



b)

$$\angle F = 180^\circ - 58^\circ - 67^\circ$$

$$= \underline{\underline{55^\circ}}$$

$$\frac{b}{\sin B} = \frac{f}{\sin F}$$

$$\frac{b}{\sin 67^\circ} = \frac{15}{\sin 55^\circ}$$

$$\cancel{\sin 67^\circ} \cdot \left[\frac{b}{\cancel{\sin 67^\circ}} \right] = \left[\frac{15}{\sin 55^\circ} \right] \cdot \sin 67^\circ$$

$$b = \left[\frac{15}{\sin 55^\circ} \right] \cdot \sin 67^\circ$$

$$b \approx 16.9$$

\therefore the fire is about 16.9 km from tower A .