

SINE LAW

Learning Goal

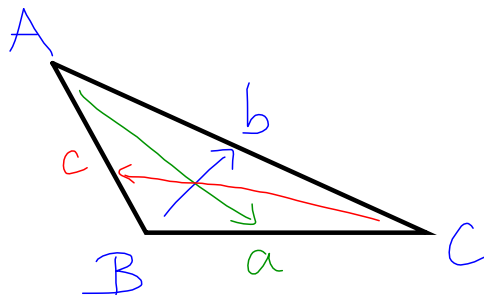
- able to find sides and angles of non-right angled triangles

Sine Law

sides - used with Non-Right angled triangles
 - formula has 3 sections but we only use 2 at a time

$$\frac{a}{\sin(A)} = \frac{b}{\sin(B)} = \frac{c}{\sin(C)} \quad \text{OR} \quad \frac{\sin(A)}{a} = \frac{\sin(B)}{b} = \frac{\sin(C)}{c}$$

angles



It is important to name the sides and angles properly.

3C - 1 - day 4 - Sine Law.notebook

Find x

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

$$\frac{x}{\sin 114^\circ} = \frac{12}{\sin 26^\circ}$$

$$x = \frac{12}{\sin 26^\circ} (\sin 114^\circ)$$

$$x \doteq 25$$

Solve for the unknown value

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

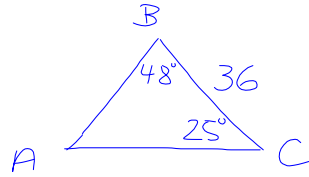
$$\frac{4}{\sin 40^\circ} = \frac{x}{\sin 85^\circ}$$

$$\frac{4}{\sin 40^\circ} (\sin 85^\circ) = x$$

$$6.2 = x$$

On the Boards...

In $\triangle ABC$, given that $\angle B=48^\circ$, $\angle C=25^\circ$, and side a is 36 cm. Find the length of AB and AC correct to 1 decimal place.

Find AB

$$\frac{c}{\sin 25^\circ} = \frac{36}{\sin 107^\circ}$$

$$c = \frac{36}{\sin 107^\circ} (\sin 25^\circ)$$

$$c = 15.9$$

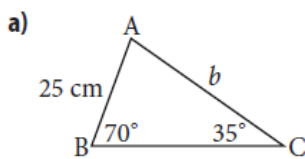
Find AC

$$\frac{b}{\sin 48^\circ} = \frac{36}{\sin 107^\circ}$$

$$b = \frac{36}{\sin 107^\circ} (\sin 48^\circ)$$

$$b = 28$$

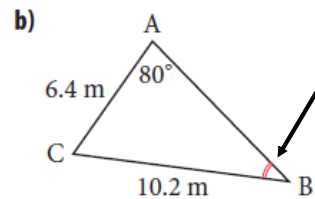
Find the missing side or angle.



$$\frac{b}{\sin 70^\circ} = \frac{25}{\sin 35^\circ}$$

$$b = \frac{25}{\sin 35^\circ} (\sin 70^\circ)$$

$$b = 40.96$$

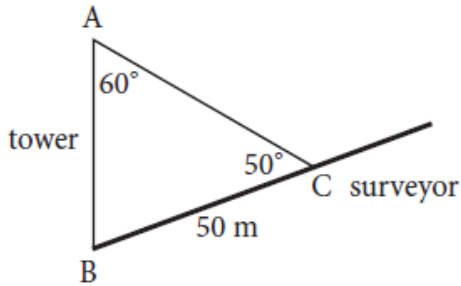


$$\frac{\sin 80^\circ}{10.2} = \frac{\sin B}{6.4}$$

$$0.617 = \sin B$$

$$38^\circ = B$$

5. A communication tower is built on the slope of a hill. A surveyor, 50 m uphill from the base of the tower, measures an angle of 50° between the ground and the top of the tower. The angle from the top of the tower to the surveyor is 60° . Calculate the height of the tower to the nearest metre.



$$\frac{50}{\sin 60^\circ} = \frac{\text{tower}}{\sin 50^\circ}$$

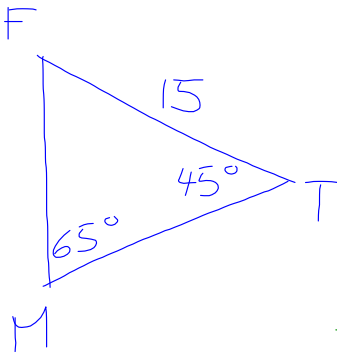
$$\frac{50}{\sin 60^\circ} (\sin 50^\circ) = t$$

$$44.23 = t$$

\therefore the tower is 44m tall.

9. Three islands—Fogo, Twillingate, and Moreton's Harbour—form a triangular pattern in the ocean. Fogo and Twillingate are 15 nautical miles apart. The angle between Twillingate and Moreton's Harbour from Fogo is 45° . The angle between Moreton's Harbour and Fogo from Twillingate is 65° . How far is Moreton's Harbour from the other two islands to the nearest nautical mile?

at M
at T



$$\frac{15}{\sin 65^\circ} = \frac{t}{\sin 45^\circ}$$

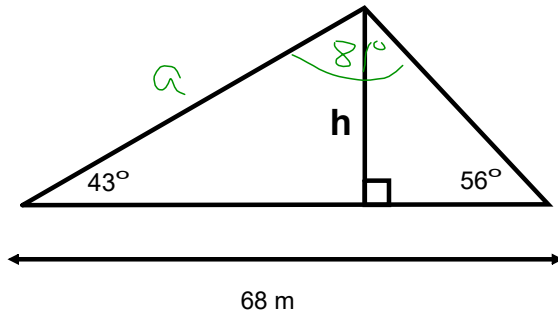
$$11.7 = t$$

$$\frac{15}{\sin 65^\circ} = \frac{x}{\sin 70^\circ}$$

$$15.55 = x$$

\therefore the islands are 11.7 and 15.55 miles apart.

Find h.



Using the big \triangle

$$\frac{a}{\sin 56^\circ} = \frac{68}{\sin 81^\circ}$$

$$a = 57.1$$

Using small \triangle

$$\sin 43^\circ = \frac{h}{57.1}$$

$$38.9 = h$$

**Enjoy the rest of
the day!**

