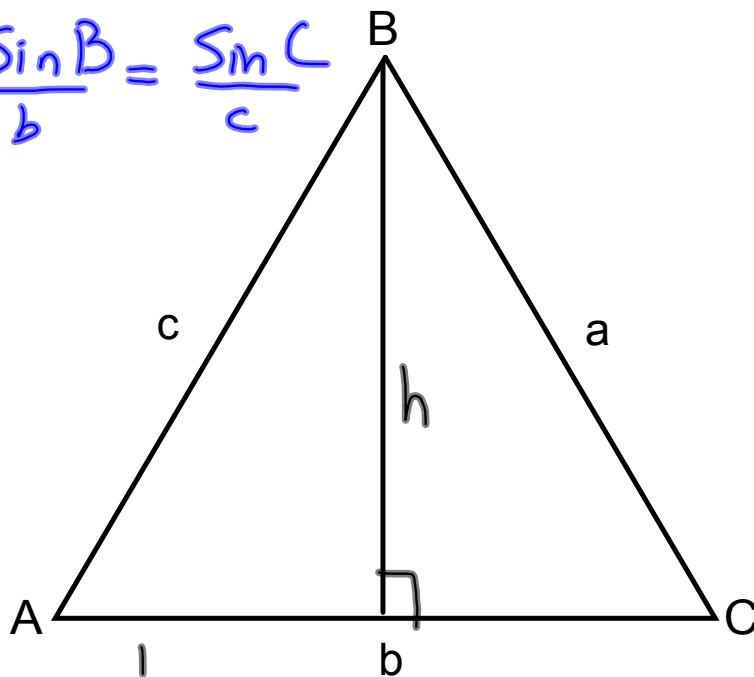


$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$



$$\sin A = \frac{h}{c}$$

$$\sin C = \frac{h}{a}$$

$$c \sin A = h$$

$$a \sin C = h$$

$$c \sin A = a \sin C$$

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

$$\left. \frac{c \sin A}{a} = \frac{a \sin C}{a} \right\} \frac{\sin A}{a} = \frac{\sin C}{c}$$

$$\frac{\cancel{c} \sin A}{\cancel{c} a} = \frac{\sin C}{c}$$

Law of Sines/Law of Cosines

You now know how to solve for unknown angles and side lengths in a right-angled triangle.

How do we obtain missing measurements in oblique (non-right) triangles?

ANSWER:  LAW OF SINES
  LAW OF COSINES

LAW OF SINES

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

Missing Side 😊

OR

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

Missing Angle 😊

Note: Any one proportional statement is all that is used at one time.

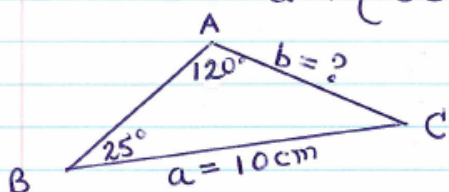
When will you use the Law of sines?

You will use the Law of Sines when:

- A) you are given two angles and a non-included side (AAS).**
- B) you are given two angles and an included side (ASA).**
- C) you are given two sides and an angle opposite to one of them (SSA).**

LAW OF SINES EXAMPLES

1. To find a missing side:



We have \Rightarrow "a", "A", & "B".

We are looking for \Rightarrow "b"

Therefore we can use:

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

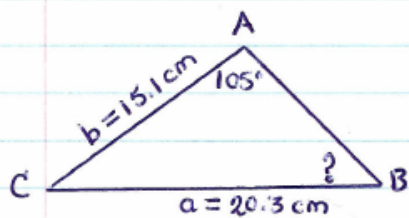
$$\frac{10}{\sin 120^\circ} = \frac{b}{\sin 25^\circ} \quad (\text{"Cross multiply"})$$

$$10 \sin 25^\circ = b \frac{\sin 120^\circ}{\sin 120^\circ} \quad (\text{Solving for "b"})$$

$$4.9 = b$$

The missing side "b" is 4.9 cm.

2. To find a missing angle:



We have \Rightarrow "a", "A", & "b".

We are looking for \Rightarrow "B"

Therefore we can use:

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

$$\frac{\sin 105^\circ}{20.3} = \frac{\sin B}{15.1} \quad (\text{"Cross Multiply"})$$

$$\frac{15.1 \sin 105^\circ}{20.3} = \frac{\cancel{20.3} \sin B}{\cancel{20.3}} \quad (\text{Solving for "sin B"})$$

$$0.7185 = \sin B$$

$$\sin^{-1}(0.7185) = B$$

$$46^\circ = B$$

Hilro