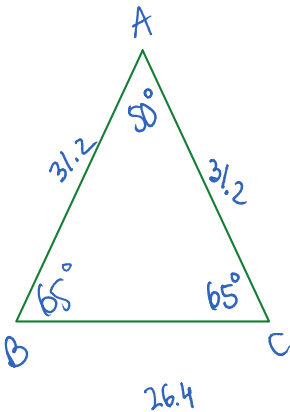


The Sine Law

DRAW AN ACUTE TRIANGLE. Each angle should be less than 90°	COMPLETE THE CHART FOR THE TRIANGLE.				
	Angle	Angle Measure	Sine of Angle	Length of Opposite Side	Ratios
		Measure each angle using a protractor. Be as accurate as possible.	Calculate the sine of each angle using a calculator.	Measure the length of each side using a ruler. Be as accurate as possible.	Calculate each of the following ratios using a calculator.
	∠A	50°	sin 50° = 0.7660	a = 26.4	$\frac{a}{\sin A} = \frac{26.4}{0.7660} = 34.46$ $\frac{\sin A}{a} = \frac{0.7660}{26.4} = 0.029$
	∠B	65°	sin 65° = 0.9063	b = 31.2	$\frac{b}{\sin B} = \frac{31.2}{0.9063} = 34.43$ $\frac{\sin B}{b} = \frac{0.9063}{31.2} = 0.029$
	∠C	same		c =	$\frac{c}{\sin C} =$ $\frac{\sin C}{c} =$
DESCRIBE ANY RELATIONSHIPS YOU NOTICE IN THE TABLES.	Ratios equal: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$ OR $\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$				

The **SINE LAW** → can be used on non-right OR right Δ (SOH CAH TOA + Pythagorean Th only for Right Δ.)

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

use if finding angles
use if finding sides.

- **side** when two angles and any side are given
- **angle** when two sides and an opposite angle are given

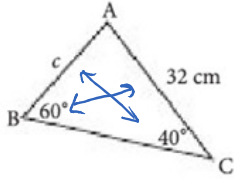
When using the sine law, start with the unknown angle or side and then create the appropriate ratio to solve.

MBF 3C1

Name: _____

Example 1

Find the measure of c .



side c to find \therefore use ratio with C
 Use the ratio with B since have both side and angle

want side \therefore put side on top

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

$$\frac{c}{\sin 40^\circ} = \frac{32}{\sin 60^\circ}$$

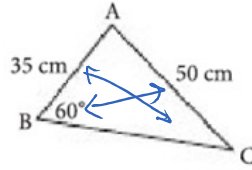
"half" cross multiply

$$c = \frac{32 \sin 40^\circ}{\sin 60^\circ}$$

$$c = 23.8 \text{ cm}$$

Example 2

Find the measure of C .



find angle \therefore put angle on top

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

$$\frac{\sin C}{35} = \frac{\sin 60^\circ}{50}$$

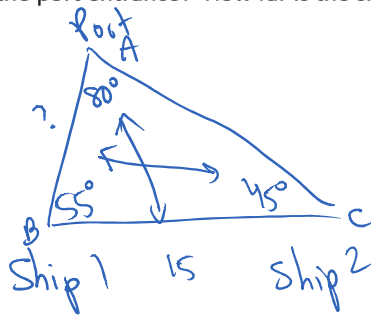
$$\sin C = \frac{35 \sin 60^\circ}{50}$$

$$\sin C = 0.6062$$

$$C = \sin^{-1}(0.6062) = 37^\circ$$

Example 3

Two ships are located 15 nautical miles apart. The angle of Ship 1 to the entrance of the port is 55° with respect to Ship 2. Ship 2's angle to the entrance to the port is 45° with respect to Ship 1. which ship is closer to the port entrance? How far is the ship from port? Round your answer to the nearest tenth.



- Ship 1 is closer to port since side c is across smallest angle $C = 45^\circ$

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

$$\frac{15}{\sin 80^\circ} = \frac{c}{\sin 45^\circ}$$

$$\frac{15 \sin 45^\circ}{\sin 80^\circ} = c$$

$$10.8 = c$$

\therefore Ship 1 is 10.8 nautical miles from port