LAW OF SINES

OBLIQUE TRIANGLES

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TOPIC OUTLINE

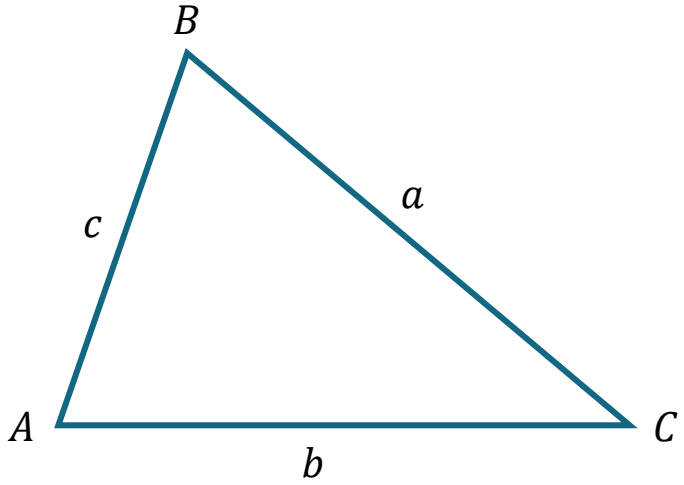
Law of Sines

LAW OF SINES

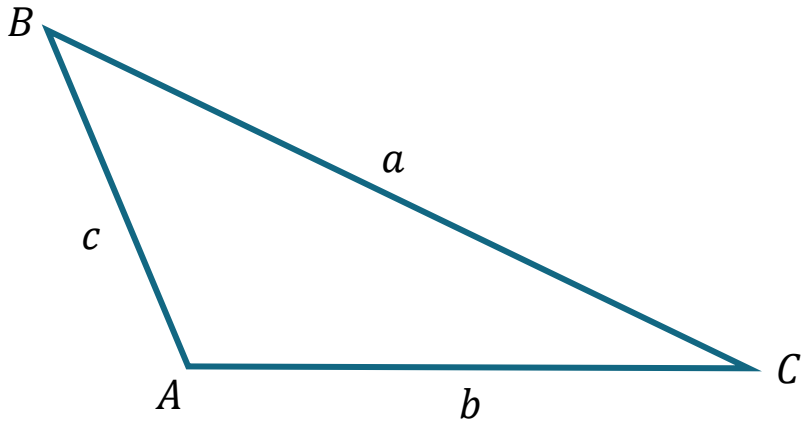
OBLIQUE TRIANGLE

An **oblique triangle** is a triangle that does not contain a right angle.

Acute Triangle – All three angles are less than 90°.

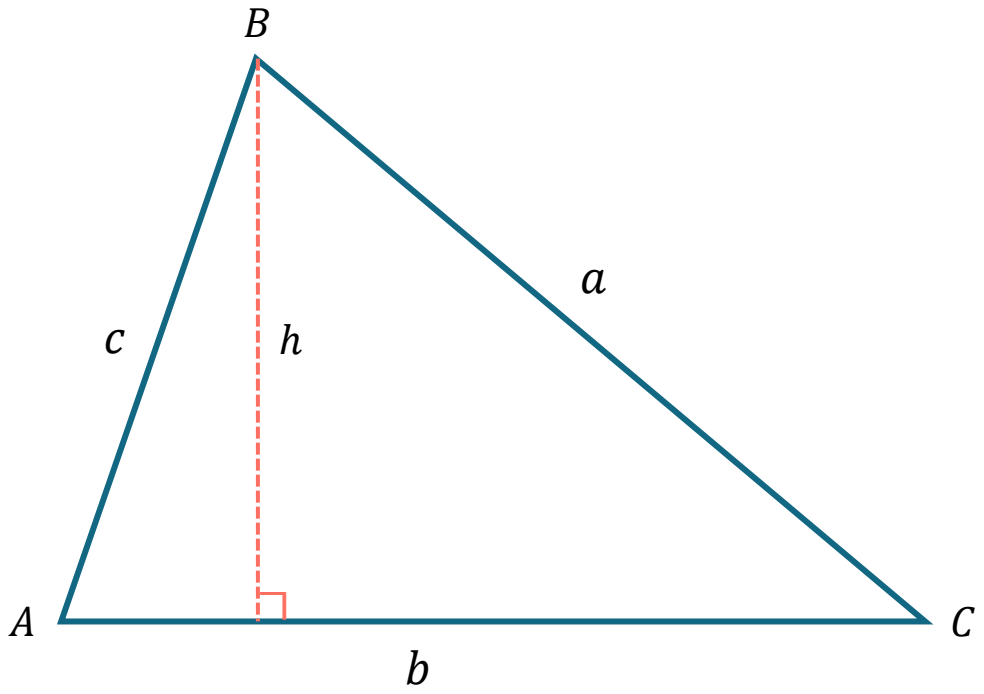


Obtuse Triangle – One of the angles is greater than 90°.



LAW OF SINES

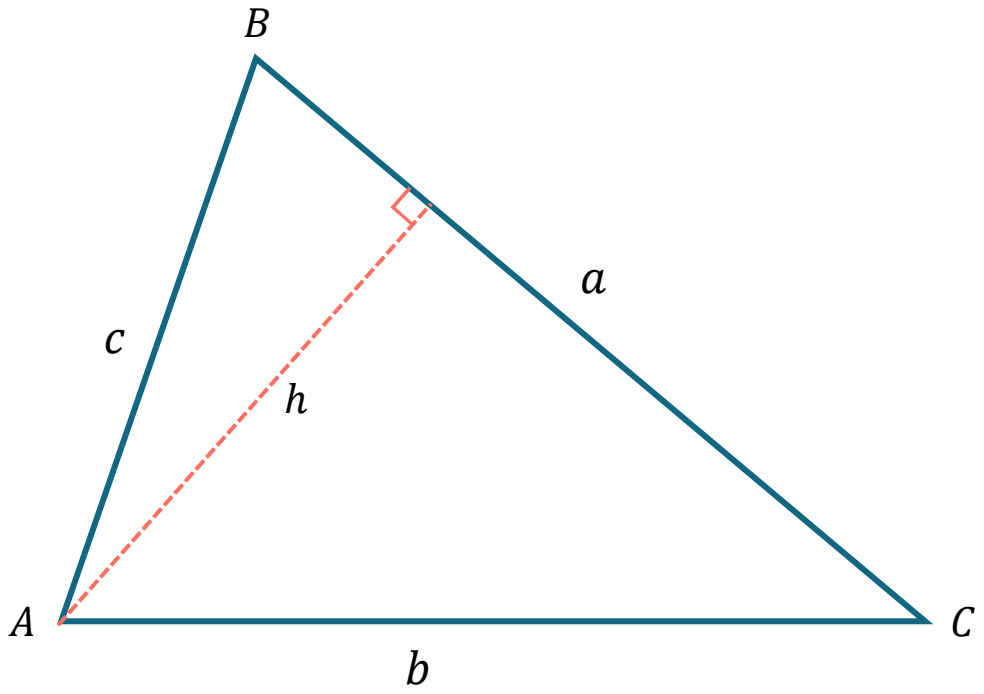
Acute Triangle ABC



Derivation of the Law of Sines

LAW OF SINES

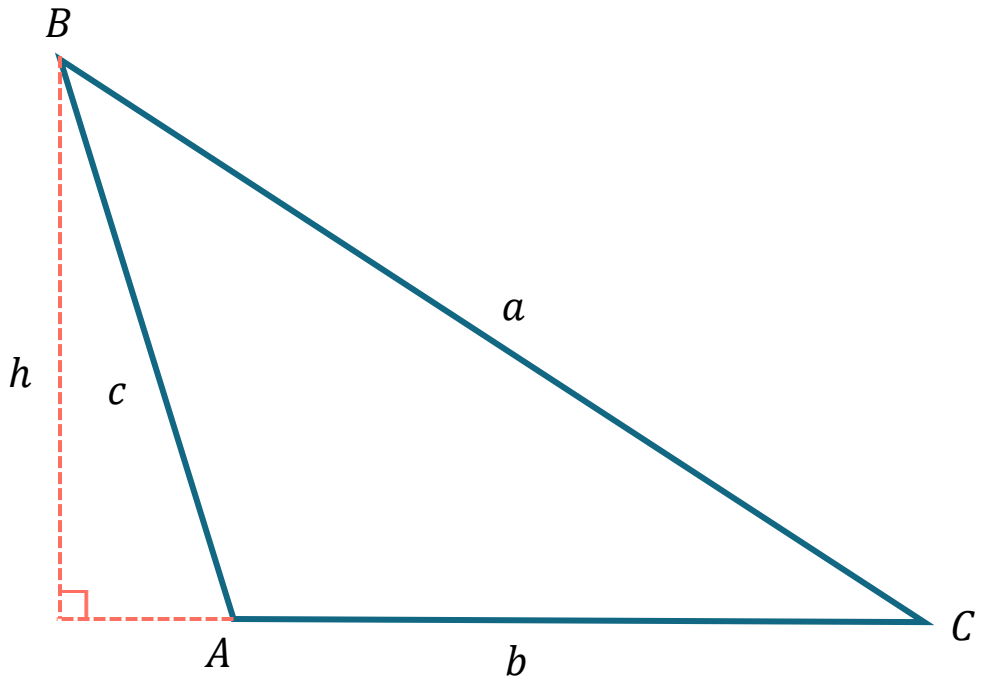
Acute Triangle ABC



Derivation of the Law of Sines

LAW OF SINES

Obtuse Triangle ABC



In any triangle ABC, with sides a, b, c

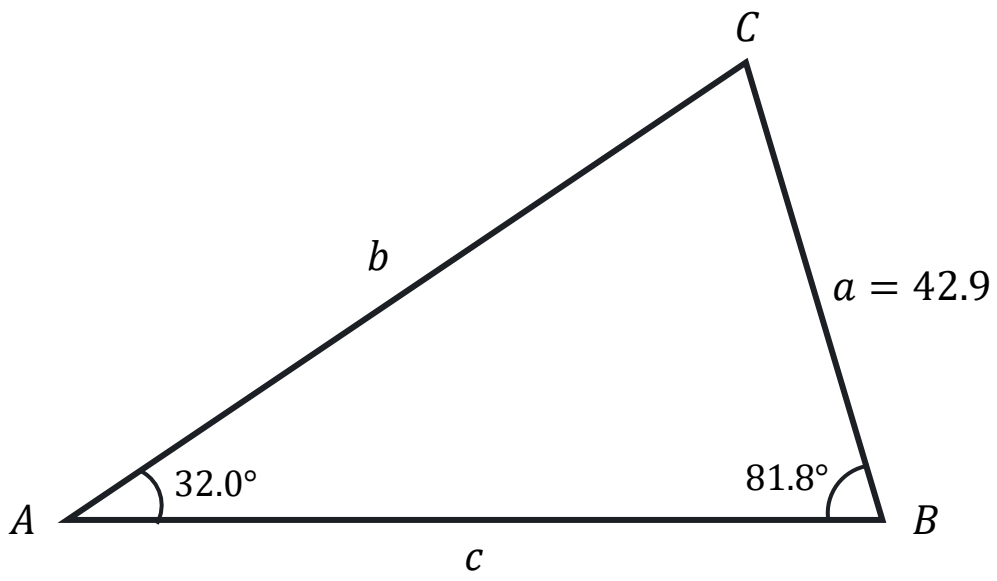
$$\frac{a}{\sin A} = \frac{c}{\sin C} = \frac{b}{\sin B}$$

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

EXERCISE

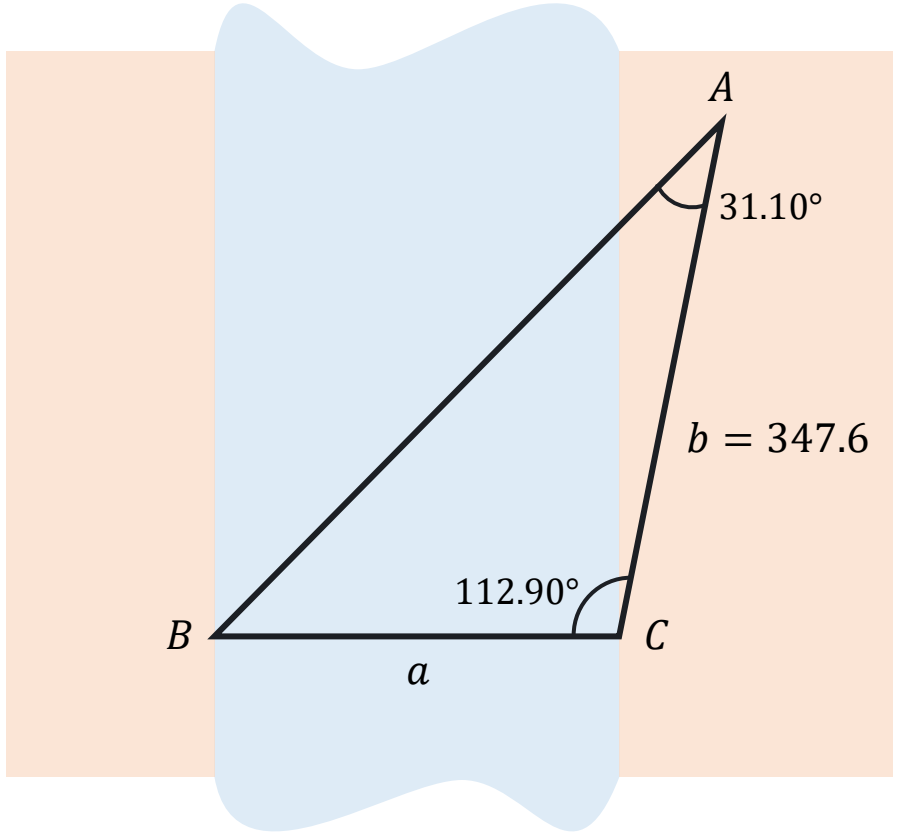
Solve triangle ABC if $A = 32.0°$, $B = 81.8°$, and $a = 42.9$ cm.

Solution



EXERCISE

An engineer wishes to measure the distance across a river. He determines that $C = 112.90°$, $A = 31.10°$, and $b = 347.6$ ft. Find the distance a.



Solution

EXERCISE

A man starts his morning walk at a point A reaches two points B and C and finally back to A such that $A = 60^{\circ}$ and $B = 45^{\circ}$, $AC = 4$ km in the triangle ABC. Find the total distance he covered during his morning walk.

Solution

EXERCISE

A flagpole 100 ft tall is on the top of a building. From a point on level ground, the angle of elevation of the top of the flagpole is 38°, and the angle of elevation of the bottom of the flagpole is 27°. Find the height of the building.

Solution

EXERCISE

To find the distance AB across a river, a surveyor laid off a distance $BC = 354$ m on one side of the river. It is found that $B = 112°10'$ and $C = 15°20'$. Find the distance AB.

Solution

EXERCISE

Two ranger stations are on an east-west line 110 mi apart. A forest fire is located on a bearing N 42° E from the western station A and a bearing of N 15°E from the eastern station at B. To the nearest ten miles, how far is the fire from the western station?

Solution

EXERCISE

A balloonist is directly above a straight road 1.5 mi long that joins two villages. She finds that the town closer to her is at an angle of depression of 35°, and the farther town is at an angle of depression of 31°. How high above the ground is the balloon?

Solution

SEATWORK