

Finding the unknown Sides and Angles of Non-right Triangles

Law of Sines

For any $\triangle ABC$ in which a , b , and c are the lengths of the sides opposite the angles with measures A , B , and C respectively:

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

Use any two of the ratios above to find a missing side or angle of a non-right triangle.

Example 1: find the unknown side of $\triangle ABC$ when you are given the measures of two angles and an included side

Solve $\triangle ABC$.

Given $\angle A = 63^\circ$, $\angle B = 49^\circ$, and $c = 78$. The problem requires you to find the missing parts of the triangle. For this \triangle that would be $\angle C$, a , and b .

$\angle C$:

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

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

answer:

$\angle C =$

$a =$

$b =$

finding a side

If you need more explanation go to the QR code below or the web address below.



<https://www.khanacademy.org/math/trigonometry/trig-with-general-triangles/law-of-sines/v/law-of-sines>

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Example 2: Use Law of Sines when the measures of two angles and the side opposite are given.

Solve $\triangle ABC$.

Given $\angle A = 48.3^\circ$, $\angle B = 94.5^\circ$, and $a = 39.4$. You are finding $\angle C$, c , and b .

$\angle C$:

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

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

answer:

$\angle C =$

$c =$

$b =$

finding an angle

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Example 3:

From point A, the angle of elevation to the top of a tree is 38° . From point B, 25 feet closer to the tree, the angle of elevation to the top of the tree is 48° . How far is it from point B to T? How tall is the tree?